FAA Aviation news

MARCH 1998

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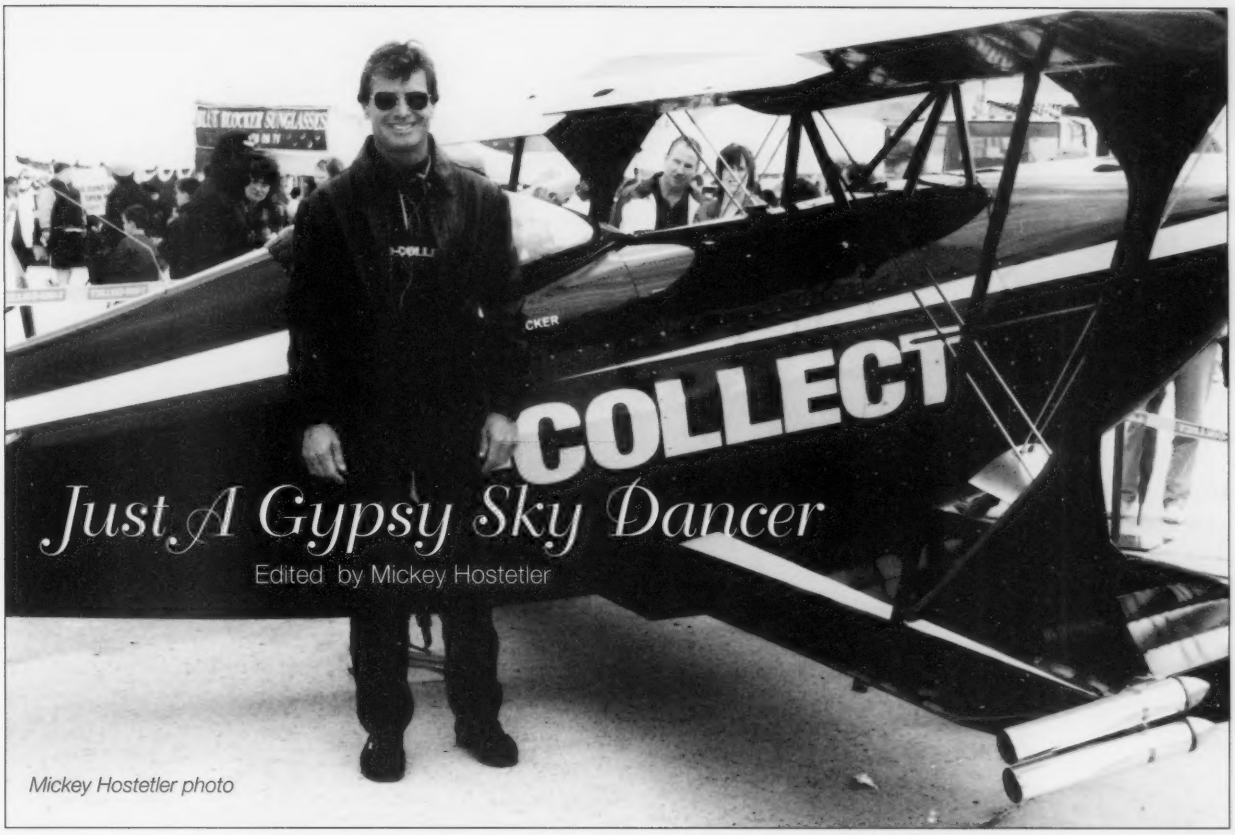
FRONT COVER: When you see Extra's and Sukhoi's, you know it's spring and air show time! See page 1 for some safety thoughts and aviation philosophy from premiere air show pilot Sean D. Tucker. Photo by David Gustafson
BACK COVER: The Beechcraft Starship *boldly goes where no one has-- well, you know the rest. Photo courtesy Beechcraft*

Winner of the National Flight Standards Service Excellence in Public Awareness Award
FAA Aviation news



Just A Gypsy Sky Dancer

Edited by Mickey Hostetler

Mickey Hostetler photo

"If you're a stubborn person, you're going to die in this business."

Is this a quote from a firefighter, scuba diver, law enforcement officer, or trapeze artist? No. The author of this quote is a dancer of sorts; not the kind you may have seen on stage. This dancer performs in the sky—yes, the sky—before thousands of enchanted men, women, and children on weekend afternoons. He's in an airplane.

One might say he appears to downright defy the laws of aerodynamics—to defy gravity—in his specially built Pitts biplane as it loops and spins its way through an azure sky. Meet Mr. Sean D. Tucker. Aerobatic pilot. Professional air show performer. Skilled artist. Extremely personable gentleman. Did I say extremely? Well, he does smile a lot.

And like the trapeze artist, Mr. Tucker indeed appears to fly through the air with the greatest of ease. Only Mr. Tucker does it without a net. Going from town to town, event to event, he calls himself a gypsy sky dancer.

Last year the day before Sean D. Tucker was to perform in the annual Armed Forces Day Air Show at Andrews Air Force Base in Camp Springs, MD, *FAA Aviation News* Editor Phyllis-Anne Duncan had the opportunity to talk with him about his profession, his background, and his dreams for the future.

DUNCAN: What is your aviation background?

TUCKER: I got my license in 1973 in a Cessna 152, but I don't think I had very good training. I remember one flight instructor who'd hit me on the hand with the microphone when I'd goof up. I never learned how to stall an airplane. In fact, I probably should have failed my private pilot's checkride because I thought I was almost going to spin, and I knew that if I went into a spin I was going to die. I was that afraid of stalling or going above 60 degrees. So I decided I was going to do something about it, and I took an aerobatic course that same year. And the first time I flew upside down I knew I wanted to be an aerobatic pilot.

DUNCAN: How long have you been a performer?

TUCKER: After college I worked as a cropduster. When I had saved enough money, I bought my first aerobatic air show airplane. In 1976 I flew my first air show in a Pitts S2A in California. But I had a real problem: I had no "death" perception. I had a lot of exuberance, and I was a natural performer in that I loved sharing with the audience, but I didn't have the other talents—the humility or the composure or the skills—to be a down and dirty air show pilot. I flew for two and a half years, and my peers were telling me that I was too dangerous. I didn't listen to them. During a performance in 1979 I got the center of gravity too far out, and I couldn't recover from an inverted flat spin. I crashed. So I had a

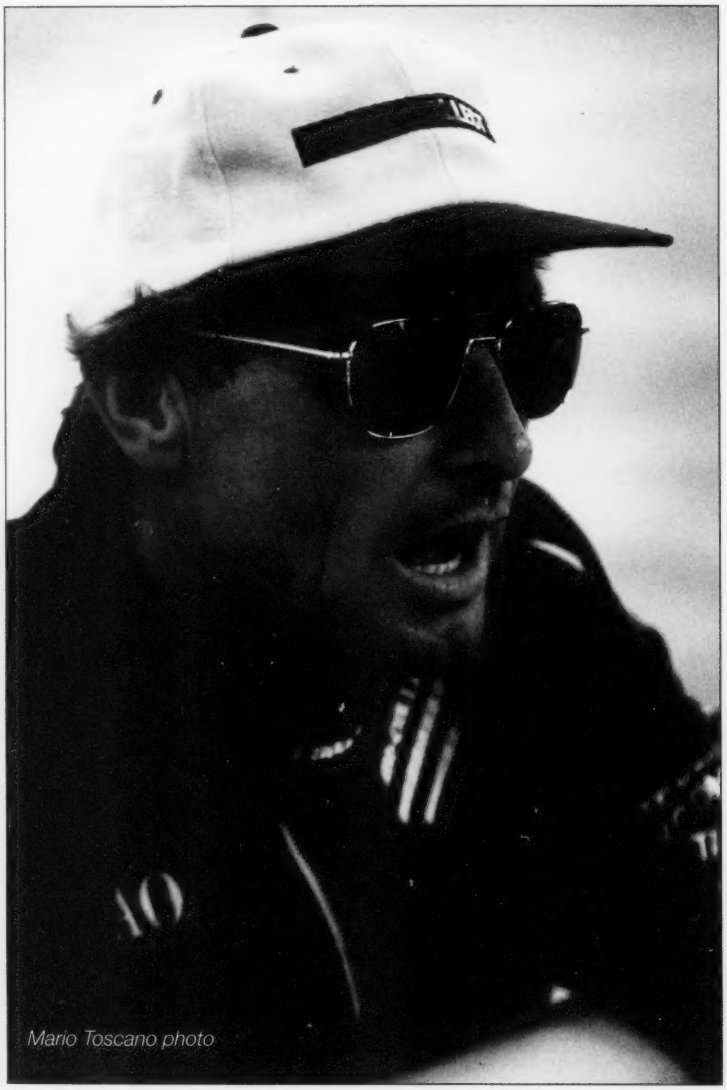
very short career. I lost my dream. I learned to fly helicopters and started crop dusting in them in 1980. I returned to the air show arena in 1986, but I had a different attitude. I didn't want a bad reputation, so I learned the discipiine and skills of operating in a confined piece of air space. I listened to people. After I became a national champion in 1988 in the advanced category of competition aerobatics, I decided to make air show flying a full-time career. I considered it to be "sky dancing," and I knew that was the path I wanted to walk in life. In 1991 I received my first sponsorship, which lasted for two years. And this is my fourth year with 1-800-COLLECT. And I fly in front of 10 million people a year.

DUNCAN: Do your sponsors ever pressure you to do something that you think is beyond what is safe?

TUCKER: Absolutely not. Sponsors have never pressured me to be dangerous. It's hard enough to find a corporation in America willing to invest in us and convince them that we are pros and we're not wild and crazy. What I do is performance art, but it's also something very special. I've been there when air show performers hit the ground, and it takes away the audience's passion. They don't want to see that. They might want to be scared a little bit. They want to be thrilled, but they never want to see you get hurt.

DUNCAN: What do you see as the greatest safety challenge you face as a performer?

TUCKER: When you first start out as a performer you want to prove yourself, but you really have to learn to back it off. I talk to the new performers because they need to know that if they get a bad reputation, one of being dangerous among their peers, it's hard to live down. We're a family, and if you alienate yourself from your family, you're not going to make it in this business. Without the help of performers like Charlie Hillard, Leo Loudenslager, and Bob Hoover I wouldn't have been able to develop or make it to this level in the air show flying business. It takes time to develop the required composure, skills, and understanding. You don't just do that in two or three years. If you're pushing the envelope at a show—and you know you're pushing it—eventually you're going to die. You always have to have tremendous focus. And if that focus isn't there, you better not get in that cockpit. If you're ill, you better not get in the cockpit. You have to have the courage and confidence to say "No."



Mario Toscano photo

DUNCAN: So, would you agree that projecting a safe "image" to the public gives a positive perception of aviation, general aviation in particular?

TUCKER: Absolutely. I think air shows have done a lot to enhance general aviation. Because of security restrictions, children today don't have the kind of accessibility to airports that I did as a child. I remember having picnics at the airport and just dreaming—because flying's about dreaming. I went to a school today in southeast Washington to talk to its science and technology students. They have never been to an airport! They were so interested to hear me share my thoughts on the magic of air shows.

DUNCAN: Is there anything you'd like to add about the mental attitude that a safe aerobatic pilot has to possess?

TUCKER: You need to think like a professional and know that you just get this blessing for a little while. You need to respect why the people are coming to watch you fly. It's not a competition against the other performer. Leo Loudenslager is a seven time national champion, once world champion, and when we go out and train together and fly together, it's a joy! [This interview

took place before Leo's untimely death from injuries suffered in a motorcycle accident.--Editor] We have our different styles of flying, and we help elevate each other. When Patty Wagstaff and I fly together, it's promoted as "Man against Woman. Beauty against the Beast. Biplane against Monoplane." But it's not a competition between us. We're complementing each other and we give each other energy. Once you start competing, you're letting your ego get in the way, and then you can't make the proper decisions.

DUNCAN: What are the most G's you pull and on which maneuver?

TUCKER: Probably almost 10 positive on a multiple snap roll, and that feels like I've been hit in the chest with a sledgehammer. It's awful. Second most is multiple snap rolls going down. And when I say multiple snap rolls, I'm talking about going down about eight to 10 snap rolls. I start getting gray after about eight to 10 depending upon the day. And once I feel that it's close, I let off and come off it.

DUNCAN: What kind of a physical regimen do you do to keep yourself in shape to withstand these forces?

TUCKER: I go to the gym three times a week, and I run three times a week. I eat wholesome foods. I train twice a day. I need to be fit. It's an athletic event. My routine lasts 14 minutes. It's my blessing. I want to make sure that it's the best 14 minutes I can give the audience.

DUNCAN: How do you deal with fatigue, which has been cited in several air show performers' accidents and which is sometimes a common aspect of being on the road so much?

TUCKER: It's tough. I try to sleep at least seven hours. I need to be in shape and eat right. Out on the air show tarmac, it's hot, so I need to stay hydrated. If you start getting behind the power curve on drinking water, you can't catch up. I can only last 20 minutes in an aerobatic flight. Maximum. That's all I can do. My body's done.

DUNCAN: Describe the performance capabilities of your aircraft and any special equipment you have on it.

TUCKER: I have almost 4,000 hours of really hard aerobatic flying on this Pitts biplane, so we've found the weak points. Some of the greatest builders in the country helped build my airplane: Curtis Pitts designed my wings. Pete Gnaedinger, who built the Eagle teams' airplanes, built the fuselage. Steve Woof, who built the Gee Bee, built the wings. Delmar Benjamin, who flies the Gee Bee, designed my cowling. It has an Eagle 1 fuselage with the Pitts S2S newest superstinker wings, with a Lycoming 360 horsepower engine. And this biplane has a soul. When I'm flying a composite winged airplane, like the new models, I can't feel the air. That's why I'm sticking with a biplane, utilizing all the surfaces. It's structurally very sound.

DUNCAN: What are some of the continuing maintenance considerations you have?

TUCKER: In the off season the engine comes off, the propeller comes off, and it gets overhauled. Every two years the wings are taken apart, the fabric comes off the wings and the fuselage, and everything is inspected. I have two full-time mechanics with me on the road. Before the show, they take all the inspection plates out and examine everything, like an annual inspection. They take the cowling off and look at the engine. Then I fly the show. After the show's done, the same thing happens. They take the cowling off. They inspect the engine. They change the oil. And then the plane is sent down to the next show site, where the same inspection process occurs. We've made it a very strong airplane, but still it's just a piece of equipment that you really need to pay attention to. You just don't walk up to it, check the oil, and fly.

DUNCAN: Describe how you plan your show. How much practice do you fly during the season? How often do you practice in the off-season?

TUCKER: I try to fly all year round. During the two months that my air show airplane is being overhauled, I have an S2B at home that I can fly. I'm always trying to choreograph a better routine. I might throw a new maneuver in—and it's a neat maneuver—but what does it do to the rest of the show? Some maneuvers that you think are the greatest maneuvers in the world—that will be the most world show stoppers—are boring to someone on the ground. Whereas maneuvers that you think are boring are the most spectacular from the ground perspective. You need advice and help from your peers and people on the ground to help you choreograph a good routine.

DUNCAN: Describe the conditions under which you would refuse to fly a show?

TUCKER: Fortunately, I think the people in the air show business are very professional. If an air show did not follow the FAA guidelines, I wouldn't fly the show. You have to have some moral character because you shouldn't jeopardize people on the ground. They didn't come to get pieces of equipment raining down upon them. I wouldn't fly a show if my airplane wasn't in top notch shape or I wasn't. I wouldn't fly a show if the weather was too dangerous. Sometimes you just have to say "No, I can't do it." There are parts of my sequence that, if the winds are too hard, I can't do my ribbon cutting, but I continue with the rest of my show. If the ceilings are too low, I compress my show, but I always keep it safe. The people I fly for are very professional. They really care. They want to be back here next year.

DUNCAN: There has always been controversy concerning maneuvers toward the crowd. What is your position on this?

TUCKER: I'm absolutely adamant that if your energy vector is directed toward the crowd and you have a mishap, you're going to kill somebody. And I believe you're committing murder. Your babies, your grandma, or your grandpa are in the crowd, and these folks don't know it's dangerous. And once somebody goes into the crowd, it's over. I've been there when performers hit the ground, and I've seen the fireball going up to the snow fence holding back the crowd. I've seen the engine fly into the crowd. I don't think [maneuvers toward the crowd are] an acceptable risk. It's immoral and irresponsible.

DUNCAN: Is there anything that you as an aerobatic pilot can recommend to other general aviation pilots to make them safer aviators?

TUCKER: Training is so key, including possibly some aerobatic training. Bob Hoover, one of our greatest aviators of all time, said, "If you can fly upside down, you're twice the pilot." And I agree with him in that you gain a certain confidence. If you're cocky I think you're dangerous. But if you have confidence, you have the proper tools to be prepared for an emergency. You can make the right decisions because your brain is still thinking. Pilots need to stay current in what they're flying and be humble about what they do. They need to respect it because they can make fatal decisions just like I can in the air show arena. My margins are just narrower. The majority of aircraft accidents is due to pilot error—from air show flying to general aviation.

DUNCAN: In a true sense of partnership, how has your working relationship with the FAA played out?

TUCKER: I feel that the industry as the whole has a very good working relationship with the FAA because the FAA is there to help and monitor. If you go in with that attitude, you can resolve any problems, and you can get along. You shouldn't let your ego get in the way. You need to have rules to follow. The FAA has done a lot to help us be self-policing so we can grow. By having a relationship in which you can communicate your needs and worries openly, you can resolve the conflict or resolve something before it is a conflict. I think that open-door relationship has to be encouraged because it is hard for the inspectors. They're under a lot of pressure. Without the FAA, we'd be in big trouble in the air show business. We need FAA.

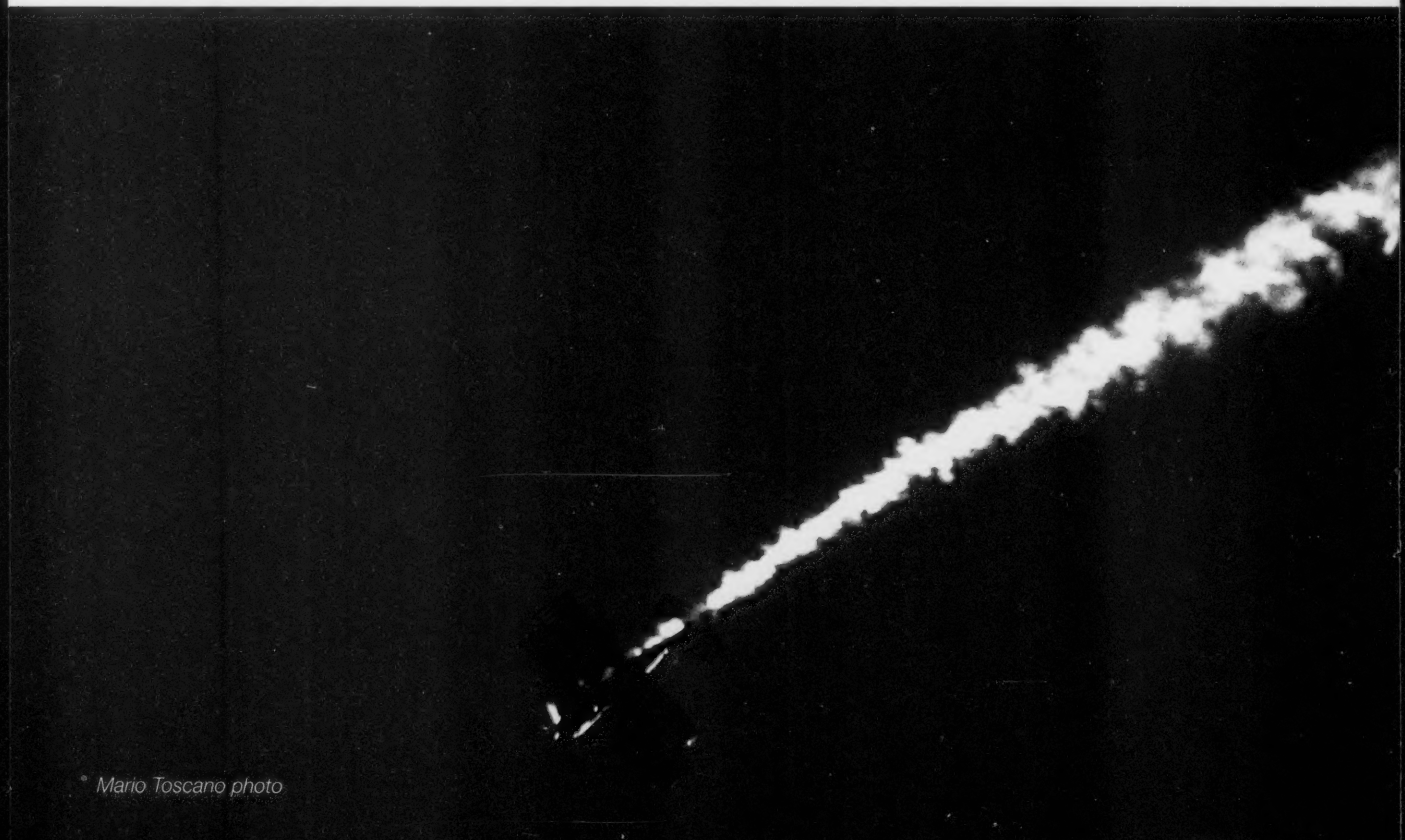
DUNCAN: Let's get a little philosophical. I know that during your performance your concentration level must be high, but what kinds of emotions do your high-level form of aerobatics evoke?

TUCKER: I think, because it is performance, I stop time for myself. I really care about this so much. To me it's very important to care that much in terms of my flying. I've never flown a perfect air show routine. I've been close. And it's really a wonderful feeling. But every performance is something from my heart.

DUNCAN: When you fly the perfect one, is it time to stop?

TUCKER: I don't think so because I love the process too much. I know when I've made a mistake in some of my maneuvers, and I just drop it and go and do the next maneuver. That performance, that feeling of performing, of communicating your love for something, and connecting with the audience, and capturing their dreams, and putting them in the cockpit is unbelievable! If you have your health, the second most important thing is your passion. Once I'm no longer passionate about it and it's just a job, I'm done.

Until then, I'm a gypsy sky dancer.



Mario Toscano photo

JUNGLE AVIATION EXPEDITION

by Fred Laird

Going through the mental tasks for getting the aircraft safely on the ground, I listened to the Captain as he began his final preparation for the critical mountain landing:

"Ok, props up . . . more trim! Flaps down a little, ok, looking good! Power up, a little more trim. More power, easy . . . easy. More power, easy . . . more trim, easy . . . easy. A little more power . . . ok . . . 70 knots, trim. Looks good . . . ok, holding 65 knots. Down to 60, a little too slow . . . more power . . . I need more power!"

The earth was coming up too fast and everything was becoming blurred. The earth was at a completely unrecognizable angle, much different than I had ever seen before from the front seat of an airplane, and it looked like we were about to crash into the side of the mountain. If the Captain did manage to land the airplane, and if it was still together, we were going too fast as far as I could tell and the airplane would probably zoom up the mountain side, and then over to the other end of the runway, and finally crash into the jungle. This was already much more than I had anticipated. I knew the landing was going to be a little tricky, but this landing would require magic.

It's five o'clock when the telephone rings and interrupts my disturbing dream.

"Good morning, sir, this is your wake up call."

It had been a long night, and I hadn't slept well, not more than two or three hours at the most. Peering out the hotel window, it was still too dark to tell if the weather was going to be good or not. The flight was now less than two hours away, and I was hoping for good weather. The jungles of Papua New Guinea were still dark. A heavy, damp mist still clung to the inhospitable rainforest, one of the world's most inaccessible wonders. According to legend, many parts of the jungle are still the domain of ghosts and spirits, places where even villagers have never been before. Incredible accounts of cannibalism are not un-

common in this region. Much of the rainforest is still unchallenged, unchanged, and unexplored.

I had arrived in Port Moresby three days earlier, on my first visit as FAA's Asian International Representative to Papua New Guinea (PNG). After spending the first two days in meetings with Department of Civil Aviation officials, I was heading back to Sydney on Thursday afternoon for meetings with the Australian Civil Aviation Authority. During one of my meetings in PNG, I was invited to fly the next morning to several remote mountain air strips which would give me a real look at PNG's domestic aviation, and two of their 450+ airports. I hadn't really thought too much about it, other than how beautiful the jungle must be from the air. I figured, "What the heck!" Then it dawned on me, "What if the weather's bad—how are we going to find the airports? What if the pilot's a risk taker? What if he doesn't have much jungle experience, 'cause I don't have any!"

Most of Wednesday evening, I went through all the "What If's," and then imagined the worst thing happening in each case. By the time I went to bed, sleep was almost out of the question.

When my wake-up call jarred me from what sleep I had managed, I looked into the early morning blackness, trying to find a clue as to what the weather situation was. I feared the worst and thought to myself, "I don't have to go on this flight if I don't want to!" Then I saw it, an almost full moon, shining unobstructed, high in the dark sky above Port Moresby. It was a beautiful sight for tired eyes. From all that I could gather from the moonlight, there wasn't even a hint of a cloud, anywhere. I breathed a great big sigh of relief and began to get ready for the airport.

The tires on the *Twin Otter* seemed awfully large. The two turbo-prop engines seemed so small in comparison with the large tires and portly airframe. The 30 year old De Havilland had been flying in the jungles of Papua New Guinea for almost all its life. I wondered how many interesting stories this old bird would tell, if it could talk.

Much to my relief, the *Twin Otter*'s captain, Bruce Johnson, was a highly experienced pilot, having spent nearly all of his last 20 years flying into some of the most remote regions of Papua New Guinea. I began to feel better almost immediately. He is also his company's *Twin Otter* instructor and check pilot. A tall, very pleasant Australian expatriate, Captain Johnson was professional in every way. After he conducted a very thorough preflight inspection, the aircraft was ready. Climbing into the right seat, I felt, at least for the time being, reasonably safe.

At seven o'clock the sun is beginning to burn off the ground fog, as the *Twin Otter* thunders down the runway at Port Moresby, climbing into the dense tropical air. The *Twin Otter* is probably one of the best aircraft for this type of jungle flying environment, but its 30 years and who knows how many engine changes, are beginning to show a little of its age. We reach full throttle before the torque gauges could get to red line. We have a full load of passengers plus a full load of cargo. Heading out on the 354 degree radial, we climb to 7,000 feet and head straight to our first destination, Wanigela!

Turning on his installed GPS receiver, Captain Johnson verifies his position from precise location readings of five orbiting satellites. After turning on my hand-held GPS receiver and punching in a few numbers, I read how far we have to go and exactly where we are over the jungle. I also checked the aircraft's receiver to see how close the two GPS receivers were.

"They're within spittin" distance, I'd say, mate," Captain Johnson remarked in typical Australian brogue. "That's bloody good!"

I could see the airstrip. It was just ahead, about seven miles, Nestled in the upper part of a deep valley we had been traveling along for nearly 20 miles. I could tell we were in for an experience. The airstrip was situated in the valley where there was only one way in and only one way out. Once we turned final, we were committed to land—there would be no second chance or enough room to make a go-around! The strip was very short, looking about as long as the width of a football field, but closer to 500 feet long. There definitely was no room for any approach or landing errors.

"I'm gonna make a short field approach and landing, although we don't really have to at this airport, Fred. I'm just practicing for our next airstrip!" said Captain Johnson. I didn't say a word, but I thought about how I was going to tell him politely that I was going to get off at this airport and wait for the next flight back to Port Moresby.

Banking steeply to the left for his final approach, the Captain lowers the remaining flaps, sets the props to high RPM, and makes his final checklist and cockpit check. At this point, I'm on the edge of my seat. Captain Johnson is calm, showing no visible signs of anxiety, as I look at him out of the corner of my eye. He's either very good and confident or absolutely crazy. (Later, I figured that he was good and I was crazy!)

Even with the high sink rate, the touchdown is still very gentle and well under control. Immediately relieved, I had my composure back to normal before we completed the roll out. Actually, it wasn't exactly a roll out; it was a landing, roll out, taxi, and parking in one, almost simultaneous maneuver. Very fluid, very nice, and very happy to be back on the ground.

In retrospect, the approach and landing wasn't all that bad, actually. It had rained the night before so the red clay and grass runway still had pockets of standing water which didn't seem to cause any hydroplaning effect on the oversized tires. The wet runway was still soft which helped slow the aircraft down, and we taxied right up to the edge of the jungle where about 50 villagers were waiting and more coming from all over.

The passengers all appeared to be villagers who probably worked in Port Moresby and were heading back home for a visit or had been on a shopping adventure to the big city. Flying is the only way the people have of getting to this village as there are no good roads from Port Moresby. Walking to this village could take up to 20 days.

The village greeters, including a multitude of children, moved in close to the aircraft just as the left prop stopped turning. The Captain asked me to stay

in the right seat as he was keeping the right engine going which would make starting the left engine back up much easier. About half the passengers had gotten got off as well as most of the cargo before I could gather enough nerve to tell the Captain that I had decided that this had been an excellent GPS demonstration and jungle landing, but I would get off and wait for the next flight back to Port Moresby.

Just as I was about to tell him that I was getting off, a villager began running toward us and started shouting, "Captain, Captain! Captain, you have to come over here, right now!" Before I could say anything more, Bruce jumped out of the cockpit and ran over to where the other villagers were standing. I knew that I had to stay in the aircraft because of the right engine still running, so I turned and looked back in the cabin to see how many villagers had remained in the aircraft. There were about seven or eight people still remaining so I decided to take a picture of the passengers. I took one picture and noticed that one male passenger, who had been looking out of the window, was now glaring at me and appeared somewhat angry so I quickly decided that I had taken enough pictures.

About that time, the captain came back to the door of the aircraft and yelled back to me, "Fred, we have a murderer on board, so don't do anything stupid!"

I thought to myself, "You mean something stupid like taking a photograph of the killer sitting behind me--that kind of stupid?"

Bruce disappeared again back into the crowd of villagers, and I was beginning to wish there was a door dividing the cabin and the cockpit, but there wasn't. After a couple of minutes, which seemed like a couple of hours, Bruce came back over to the airplane and said that the local villagers had identified one of the men still on board the aircraft as someone who had killed a person in a neighboring village and thought that they should remove him from the airplane. I sincerely agreed with that! Several villagers boarded the aircraft and, after a couple of minutes, persuaded the murderer to get off. He wandered off with the other villagers as if it was no big deal, but I was so very glad he decided to get off the airplane without putting up a fight. (I discovered that a life is not given much value in these remote villages, so punishment for murder is very light, a few months or years in prison, which is viewed as free shelter and food by the murderer.)

After climbing back up in the cockpit, Bruce seemed very relieved about the situation. "So, Fred, what was it you were about to say before we were so rudely interrupted?"

"Oh, yeah. Well, I was just about to tell you how nice you made the approach into this airstrip and how good that landing was! You've done this before, haven't you? Where's that next little mountain airstrip we're going to? I can't wait to see it!" I failed to see any more logic with my earlier decision; plus I learned that the next flight wasn't coming for another couple of days—or maybe weeks.

With flaps at 15 degrees, we made a short, soft field takeoff, and, because of the rapidly rising terrain, we had to make a maximum performance takeoff and climb out. An engine failure after takeoff would mean a controlled flight back down into the jungle. Both engines performed perfectly, and, soon, we were back up to 7,000 feet, heading down another valley, looking at peaks shooting up to several thousand feet above our cruising altitude.

Crossing a jagged ridge line, we were now flying over a very beautiful, yet very deep valley.

"There it is, Fred. That's where we're landing," said Bruce as he banked hard to the left to navigate around another mountain peak.

"Where? I don't see it," I said.

"Right over there, almost at the top of that mountain right in front of us!"

All I could see was the side of a mountain that we were heading directly for, and if we didn't start turning soon, we would have no place to go but to crash into the side of it. "Do you see that church over there, and those other smaller buildings? The airstrip is just between the church and the buildings. It's running up the side of the mountain. Do you see it yet? That's the runway!"

"Nuh-uh, that's not a runway!" I said. "It can't be a runway, can it?"

The runway looked like it was much shorter than the one we just landed on, but it went straight up the side of a mountain, with the up-slope varying between seven and 15 degrees. Actually, it didn't go straight either, it turned about 25 degrees to the right about two-thirds up the runway where the up-slope went from around seven degrees to approximately 15 degrees. At this point, I had no clue what approach or landing technique a pilot would use to land on this type of runway. A fly would have no problem with this runway at all. However, I knew that an airplane didn't maneuver like a fly.

"I'm going to have to carry some power all the way to touchdown, then keep the power up so we can make it up the last part of the runway," the captain said. "It's going to be a little rough and exciting, but don't worry, I've made this landing many times before." Actually, I don't mind rough, but I'm not into "exciting" anymore like I used to be.

Going through the mental tasks for getting us safely on the ground, I listened to Captain Bruce as he began his final preparation for the critical mountain landing:

"Ok, Props up . . . more trim!"

"Flaps down a little, ok, looking good!"

"Power up, a little more trim."

"More power, easy . . . easy."

"More power, easy . . . more trim, easy . . . easy."

"A little more power . . . ok . . . 70 knots, trim."

"Looks good . . . ok, holding 65 knots."

"Down to 60, a little too slow . . . more power!"

Before I fully realized this was just like my dream, wham! We were on the ground, climbing up the side of the mountain like a speeding, oversized trail bike. It was simply amazing—it was magic! But the power still seemed too much, and it looked like we were going too fast to be able to make the final 25 degree turn to the right before quickly coming to the runway's end.

"I need more power or we're not going to make it to the top," Bruce said.

Surprisingly, with the power now up to around 65 percent, we barely made it to the top of the runway. At the top I saw that there was almost level ground and a spot wide enough to turn the aircraft around. We had actually made it! I was numb but very thankful to be on the ground.

"How'd ya like that one, mate?"

With a slight grin on my face, I looked at Bruce with much wonder and amazement. We had made a successful arrival at this tiny airport, and Bruce had just became an instant hero of mine. "That was a great job, Captain," I said. And it truly was!

While the remaining passengers and cargo were being off loaded, I began to appreciate the wild, yet natural beauty of Papua New Guinea and the tenacity and courage required of bush pilots here. Bruce was obviously well-experienced and proficient; I don't think he would dare this type of flying if he weren't. It's an experience that many of us mainland U.S., paved runway pilots wouldn't be able to handle even after years of flying.

Twenty minutes after we landed at this small mountain airstrip simply named Fane, we were now looking down the runway we had just landed on. It was a very strange sight. I couldn't see the end of the runway as it curved to the left and appeared to go straight down the side of the mountain. Straight ahead and about two miles away, there was a very tall mountain, and off to the left of the runway, a very deep valley. There was nothing between the end of that tiny runway and Port Moresby, other than tall mountains, deep valleys, and very dense jungle.

The takeoff briefing from Bruce went something like this: "Once I release the brakes, we're committed to go. In the event of an engine failure, we're still going, regardless of where it quits. If we lose one, I'll bring the good engine back a little to help offset the adverse yaw. If we lose both, there's a 3,000-foot drop-off at the end of the runway which should help us out a little, and we'll simply land someplace down in the jungle. Are you ready, Fred?"

"Let's go!" I said. What else was there to say?

"Brakes set, flaps set at 15 degrees, props up, power up, torque looks good; ok, let's get out of here."

The noise from the two PT-6 turbo prop engines is almost deafening as the *Twin Otter* begins whisking its way (literally) down the runway. As we begin to pick up speed, the runway makes a turn to the left. We hit a drop-off and my stomach shoots up to my throat, and I begin to giggle. I can't help myself. My nerves may have totally unraveled, but I'm actually tickled and really laughing out loud. Bruce doesn't notice, and I'm saved from embarrassment.

I can see the end of the runway. It's right there, right in front of us, rushing toward us at lightening speed. Suddenly, we're flying again. By now, the smile on my face was the size of Texas. Bruce looked at me, he grinned, and then asked me if I want to fly it back. Without hesitation, I said, "Yep!" At 7,000 feet, I'm flying us straight toward Port Moresby. The GPS was working great, keeping me right on course.

For the first time that day, I was finally in control of my own destiny, or at least that was the way I was feeling. For the first time in my life, I felt a very special appreciation for the men and women who fly in one of the most remote aviation environments in the world. This is a country where there are very few land-based navigational aids that are capable of providing the pilot with the type of pinpoint accuracy needed in the jungles and mountain regions of Papua New Guinea. Most, if not all, of the aircraft in PNG have GPS receivers. Pilots are using them on a daily basis. Without GPS, many of the 450+ PNG village airstrips would not be accessible by air on a regular basis. Without that air service, those villages would become isolated and once more cut off from civilization. If there was ever a place that has benefited from GPS, it is Papua New Guinea.

I had a wonderful experience flying with Captain Bruce Johnson in the mountains and over the jungles of Papua New Guinea. Mere words cannot begin to express the thoughts and feelings I had from this brief encounter.

On a sad note, only two months following my jungle flying experience, the same venerable *Twin Otter* I flew in crashed during takeoff, killing all 15 people on board. It is suspected that a highly flammable substance, which may have been placed in the aft cargo compartment without having been detected, exploded shortly after takeoff. PNG Government officials are currently investigating the accident to determine its probable cause.

Papua New Guinea is looking into the requirements necessary to permit GPS as the sole means of navigation for operations in instrument meteorological conditions, including instrument approaches. GPS will further expand aviation while enhancing aviation safety in Papua New Guinea. However, with very limited resources, technical and budget constraints, PNG may not even be able to reach this point. For example, all 450+ airports must be surveyed to appropriate WGS-84 standards. Enroute and approach procedures must also be developed. Without outside help and financial support, PNG has little hope. Yet, the full potential and use of GPS has the ability to provide so many positive benefits for this developing country. This is a country rich in natural resources. Many foreign governments and businesses seem interested in only taking what they can from this land. These same governments and businesses could provide financial aid to assist PNG in achieving a safer aviation system for a fraction of the cost of just one aircraft accident. The benefits would far exceed the cost.

Who knows? The value of a life in Papua New Guinea may begin to increase. It's something worth hoping for!

Mr. Laird is an FAA aviation safety inspector assigned as an International Representative in Singapore.

This article is a bit of a departure from our usual fare, but there are a number of safety messages implicit in it—proficiency, experience, confidence in a well-maintained airplane. Bush flying of this type exists in few places in the U.S. anymore, and it takes a rare type of pilot to have a long career in this type of endeavor. And it takes a rare type of FAA inspector who goes along for the ride!—Editor

A REAL "SOLO" FLIGHT

Many pilots lament automation in the cockpit and fear that someday they will be replaced. Recently, in Ohio a pilotless aircraft took off and flew for two hours. A modern fly-by-wire jet? A top secret military aircraft? Alien technology from the 1947 crash at Roswell, NM? Would you believe, an Aeronca *Champ*?

The *Champ*'s pilot had made a precautionary landing at an Ohio airport because of engine problems, and, indeed, the engine on the aircraft quit on the runway. Not wanting to block the runway for other users, the pilot hopped out and—can you see this coming—hand-propped the aircraft to re-start it. The venerable *Champ* not only started up again but commenced to taxi down the runway, the pilot in pursuit. Because the pilot had trimmed nose up for the landing flare, the aircraft rotated and began to fly. The *Champ* climbed to about 2,000 feet and began to circle before heading in a northeasterly direction with a state highway patrol aircraft and a pilot in another private aircraft in pursuit. Eventually the *Champ* would reach an altitude of about 12,000 before crashing and being damaged beyond repair.

Fortunately, no one was injured, and the runaway *Champ* did not pose a threat to other traffic in the area, thanks to the position reporting of the pursuit aircraft. This incident serves to emphasize—as we have repeatedly in *FAA Aviation News*—that hand-propping should only be done under strictly controlled circumstances and then only as a last resort. The pilot in this case may have had good intentions to clear the runway quickly, but it cost him a small dent in his pride but irretrievably his vintage Aeronca *Champ*.

SERVICE DISCREPANCIES

The FAA's Small Aircraft Directorate tells us that recently some airplane flight tests were to be performed using a PA-38 which was manufactured 19 years ago; this airplane had an annual inspection three months before the scheduled airplane flight tests. While establishing conformity of the airplane for this series of tests, there were three major discrepancies noted. First, a bulkhead had been installed, in the field, via a service bulletin, but the number of rivets specified in the service bulletin was not used (three had been left out). Second, the elevators had cracks in the trailing edge which had been stop drilled and a weld applied as well as automobile putty. Third, the rudder cable tension was found to be 15 pounds less than the specified value, well outside the specified tolerance.

It should be clear that if a component is signed off in the logbook as having been installed per a specific document, then it should be done to all the requirements of the document or good reason presented for any deviations. With rivets missing, this bulkhead may not have been able to perform its intended function. Likewise, any control surface which has damage should be either repaired or replaced, as specified in the manufacturer's maintenance manual, or an analysis from an acceptable source such as a Designated Engineering Representative should be presented to confirm that the control surface is in balance, still meets strength requirements, etc. The cable tension is another highly important item. This airplane model is approved for spins and, in fact, is currently used for spin training. With the rudder tension less than specified, rudder deflection under flight loads will be less than specified. As a result, spin entry and especially recovery may be affected. The entry could be different from that expected and/or the recovery may take longer; worse case, it could result in no recovery.

Since this airplane was procured from a normally reliable source, it is believed to be representative of the type of maintenance which many of these older and perhaps some newer airplanes receive. Also since this airplane is representative of many airplanes manufactured by different companies and used in the training environment, care should be exercised to ensure that all manufacturer's maintenance procedures are accomplished. It must also be noted that the aircraft owner is responsible to ensure that the proper maintenance is performed. It cannot be emphasized too highly that airplanes, especially those used in training and/or rental, have the proper maintenance performed to achieve the expected performance.

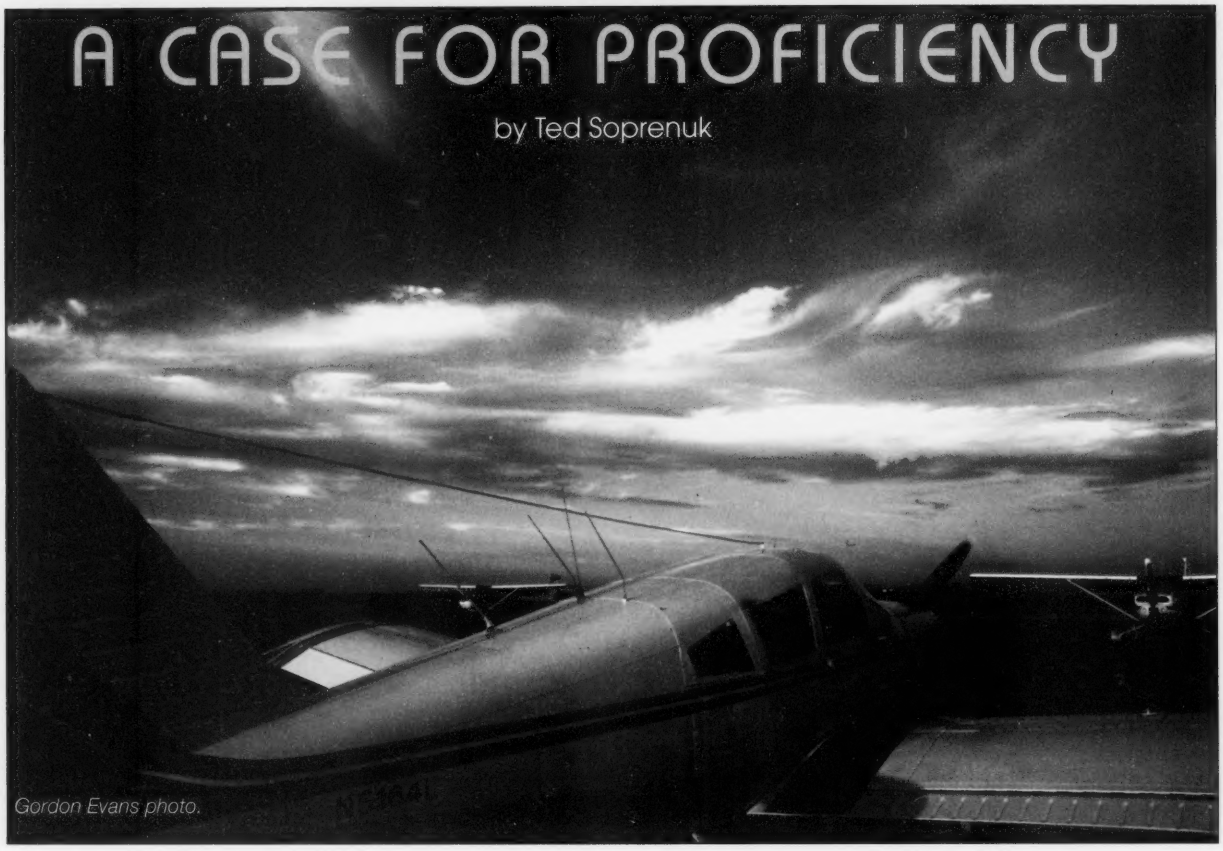
NEW IFR CHART DATA

New information has been added to some select IFR Enroute Low Altitude charts. The new information consists of Computer Navigation Fixes (CNF's) which are intended to provide pilots relying on GPS or other database navigation systems the information necessary to identify required positions using only that equipment. Initially CNF's will be added to Mileage Breakdown points (turns) on airways, which are currently charted with just a small "x." Pilots using non-database navigation systems (e.g., VOR, DME, NDB, etc.) will continue to identify airway turns in the same manner that they do now (e.g., intercepting next radial, etc.). CNF's are for database utilizing navigation systems only, and do not have any Air Traffic Control (ATC) functions. ATC will not have aircraft hold at or report passing a CNF. Likewise, pilots should not request routing to or via a CNF, and pilots should not reference CNF's in communications with ATC.

The first CNF's appeared on the Alaska IFR Low Altitude charts effective January 1, 1998. The remaining CNF's will be phased-in on all Government IFR Low Altitude charts over a period of three or four cycles.

A CASE FOR PROFICIENCY

by Ted Soprenuk



Gordon Evans photo.

It was a job! Flying Lears for a living after the airline folded seemed okay at the time. After all, I considered myself lucky to find a jet job after only two months of not flying. In this economy, that's not too bad.

I was hired and rated in the -35 with the intention of being turned loose as a captain some months down the road. However, on the morning of August 17, 1983, it was a Lear 25 that demanded my attention.

It was a warm, sunny day in Wilmington, DE, and I had a 0700 ferry departure. After the usual early morning motions, the captain, Bill, and I found ourselves outside the motel discussing our predeparture division of duties, which included weather, flight planning, fuel, etc.

The previous day's flying had been, in spite of everything we did, one in which events did not turn out according to plan. I remember saying, "What else can go wrong?" How could I know that question would be answered the very next morning?

I allowed myself the luxury of at least one more yawn before climbing into the courtesy wagon. The drive to the airport was short. After arrival I checked the weather and filed. Bill preflighted the aircraft and even drained the sumps—a messy job you don't see too many pilots doing on a regular basis. It's a good thing he was a careful and meticulous flier. We were going to need all the help we could get.

ON THE ROLL

The weather was clear, and it was Bill's turn in the left seat. Checklists completed and taxi clearance received, we trundled off to Runway 27.

I thought back to the previous month when he and I had practiced power-off approaches into ILG while flying ferry legs, gliding in from pattern altitude. But never did it cross my mind that this informal training would be practice for the real thing.

"I don't think you'll make it," Bill had once joked. "I'll bet you a case." A crystal ball might have saved Bill the money on that particular wager.

A Gulfstream G2 preceded us off Runway 27, and a voice you never connect to a person cleared us for takeoff. After a last-minute recheck of the "killer" items—spoilers retracted, flaps eight degrees, trims set—we were ready. Bill lined up and, after a moment, applied power. I backed him up on the power levers.

It is perhaps this immediate control over my destiny that is so seductive and keeps me coming back to this

business: "Lights, stall warning on...power set...airspeed." With that, Bill released the nose wheel steering. "Engines okay, V1...rotate."

As Bill came back on the yoke, I looked out and up in the direction we would be flying. At about 500 feet a flock of some 200 starlings was making its way from left to right. I've had bird strikes before and told myself this one wouldn't be any different—we would hit one or two if we hit any at all.

"Gear up," was the next command. "Gear coming up," I responded, moving the handle. Looking down as I reached for the flap handle, I felt increased, positive G's as Bill made an effort to get above and behind the flock. As I lifted the flap handle I heard numerous rapid thuds. I looked up in time to see the last few birds hit the windshield.

BIRDS HIT THE FANS

We were at a high pitch angle in a left bank when suddenly it got VERY quiet. I searched the instruments for contradiction to what I already knew but didn't want to admit. I looked for some sign of engine life. Anything. But there was nothing. It took me two seconds to realize my chances of walking away from a modern jet aircraft—with no power and at 500 feet just after takeoff—was as close to myth as you could get. "We're dead," I thought.

"Tell them we lost both engines," said Bill. I keyed the mike for what I thought would be the last time and transmitted.

"Cleared to land any runway," was Tower's reply.

Bill glanced out the left window, figuring our chances of landing back on the field. Abandoning that line of thought, he leveled the wings.

Stickshaker! We were on the verge of stall and coming down fast at a high glide angle. I looked out ahead and saw a large green field. "Maybe we're not dead after all," I thought. I forced myself to act. My internal mechanism for survival, spurred by knowledge from the past, reminded me that any amount of gear down was better than no gear at all.

Through concentration and will power, Bill kept us flying in and out of stickshaker. He was very busy. "Gear and flaps coming down," I said, reaching for and moving the respective handles. The gear locked down and the flaps extended, it was later determined, to about 11 degrees. I looked out to see where we would hit and braced myself for impact.

We were half gliding, half stalling into a light industrial area. I saw a car move from left to right through an intersection we would reach—with a little luck—in the next few seconds. We clipped the top of a tree between two buildings and in a 15 degree right bank came crashing down on the left side of the road. At the last second Bill rotated the nose upward to arrest our downward movement.

ROAD HOG

The left tip tank impacted the top of an empty car. The right tank ruptured and leaked fuel after hitting the road. Both main gear struts drove through the wings. We bounded back into the air and glided through the intersection at two feet AGL, leaving the right main gear at the stop sign to mark our passage.

We ran that stop sign at approximately 110 knots and entered a soybean field. There was a heavy deceleration as the three-foot high plants resisted our forward motion. The left main gear tore off and came to rest in the field, as did our right tip tank. The aircraft swerved to the right, out of control, then to the left just before stopping.

I jumped out of my seat and yanked the emergency door handle in one motion, tumbling out of the aircraft. I was glad to see Bill behind me. We ran like thieves, putting enough distance between ourselves and the aircraft to survive a nuclear detonation.

Then we just stopped and stood there, waiting for the explosion and fire that follows every car and plane crash you see on television. But all we could see were thin wisps of whitish smoke rising from each end of the left engine.

Bill looked at me and asked if I was okay. I said, "Yeah," and asked the same of him. Getting an affirmative, we shook hands. Jumping up and down, I put myself behind two or three rebel yells, partly from emotional relief and partly from knowing I had beaten the odds.

After my elation at being allowed to continue walking the face of the earth, I thought more seriously of the possible consequences of the matter. Fortunately, good news arrived with the police: aside from superficial property damage, including the premature harvest of some soybeans, nothing on the ground had been seriously injured or damaged.

They say people under stress see a slow-motion unfolding of events. It didn't appear that way to me. If anything, the passage of time had been much too fast. Approximately 10 seconds elapsed between the sickening thud sounds on the windshield and our initial contact with the ground. No time to talk over our predicament, read a checklist, or even say a prayer.

We pilots spend our whole lives preparing for that one event from which we can skip away or never see the sun rise again. It was a combination of luck and skill that saved our skins that day. We each did what the seat required and continued with our necessary duties until we couldn't do them anymore.

Remember that the next time you train.

This article originally appeared in the newsletter, "Fort Worth Wings," published by the FAA's Forth Worth (TX) Flight Standards District Office, which reprinted it from "Professional Pilot." The author is now an Aviation Safety Inspector at that FSDO.

GEAR UP LANDING ACC

by Kenneth J. MacDonald

There is an old saying in aviation that goes like this: "There are two kinds of pilots: Those who have landed with the landing gear up and those who are going to."

We want to exhibit always the behavior that will ensure that we will not be in the first category. Every year, without fail, however, a new group of pilots is initiated into the ranks of those who have. Sad, but true.

The accident report reads something like this: The cause of this accident was the failure of the pilot to extend the landing gear. The question is, why did the pilot fail to extend the landing gear? Analysis of gear-up accidents reveals several things:

1. **The pilot is distracted** at a critical time during the approach or landing phase of the flight. This is probably the most common reason why pilots land gear up. If we change our plans we may forget to perform an action at a critical time. If our normal procedure is disrupted by an unexpected activity, we may fail to act. Our mind is concentrating on something other than the standard procedure. A pilot arrives at the place, where he or she normally would put the gear down, but is at a strange airport trying to figure if he or she is downwind for the correct runway. The landing gear remains up. The pilot may be distracted by an unusual request or change in clearance from ATC, may have an aircraft system problem, or may have done a go-around and failed to put the gear down again. We must remember that if anything unusual occurs we will be distracted and must pay special attention to the checklist to ensure that it has been complied with.

   [At a seaplane fly-in a couple of summers ago, I witnessed a pilot land gear-up on a grass strip. He was arriving for a mixed seaplane/land plane fly in, and several people spotted him on final approach with the gear up. He was not monitoring the published frequency for the fly-in and could not hear the radioed reminders. People rushed out on the strip to wave him off to no avail. The runway was wide enough that the pilot side stepped and plunked down on the grass. He later said, "I saw all those people out there waving at me, and I forgot to check for the gear being down." There was minor damage to the underside of the fuselage—if you're going to land gear-up, do it on grass—and the props were bent, but no one suffered any injury, except perhaps the pilot and his pride.—Editor]
2. **The pilot is suffering from fatigue.** Fatigue causes a narrowing of attention, and we tend to focus on one thing and neglect another important task. An example is a pilot arriving at home base late at night after flying all day. He or she is tired and focusing on the nighttime landing but forgets to put the gear down.
3. **The pilot is overstressed.** Stress is the nonspecific response of the body to any demand made upon it. Stress is cumulative. If we are thinking of the problems we are having with the IRS and we have a fight with the spouse, we may be at a high level of stress when we go flying. Flight itself adds stress because of noise, vibration, turbulence, problems with aircraft systems, or ATC. The demands of the flight may make us feel as if we cannot complete the tasks in the allotted time. Stress will cause us to work at a reduced performance level. Stress narrows the range of things that we perceive, causing tunnel vision, and we may neglect to perform an important task because we are focusing on something of relative unimportance at the time.
4. **The pilot used the checklist but never really checked anything.** The pilot made false assumptions about the condition of items on the checklist. This failure also occurs when using the mnemonic GUMP—gear, undercarriage, mixture, prop. If you recite an item you must be sure to complete the required action. Recite, touch, and look will enhance the use of GUMP or a written checklist.
5. **The pilot operated at an unacceptable level of risk.** Doing touch and go landings in a retractable gear aircraft puts one in the position of reaching for the wrong switch. This is particularly bad in some Beech *Bonanzas* because the switch is in a different place in different models. When we are busy and working under stress, the older, more familiar routine will win out, and we will likely raise the gear instead of the flaps. If we develop the habit of raising

IDENTS

the flaps while still on the runway after landing, one day we will be busy and the old habit will win, and the gear will come up instead. (We know that the wheels are not supposed to come up while the aircraft is on the ground because a squat switch opens and protects the system from human failure. That is good, but every year it happens again.) The moral of the story is maybe don't do touch and go landings and don't get in the habit of raising the flaps on the runway.

How can we protect ourselves from this human failure and always remain in the group of pilots who are yet to land with the gear up? Since we are creatures of habit, the answer is to develop a good habit. What we need is a strong habit intrusion that will always win. This can be done by developing the procedure of always checking the gear position when crossing the boundary of the airport. Soon it will become so ingrained that no matter what else is going on, we will always checking the gear position at that point. I know that this works because one day when I was inappropriately distracted, I found myself over the middle marker—my last-minute check—with the gear up. I put them down and made a normal landing.

Develop this habit and it will save you, too.

Mr. MacDonald is an aviation safety counselor for the FAA's Boston (MA) Flight Standards District Office. This appeared in the FSDO's aviation safety program newsletter The Boston FSDO Communicator.

Checklist Failure and Lack of CRM = Wheels Up Landing

by H. Dean Chamberlain

Two years ago an airliner landed wheels up at the Houston Intercontinental Airport, Houston, TX. Then, the DC-9-32, slid 6,850 feet down Runway 27 before stopping about 140 feet left of the runway centerline. There were 82 passengers, three flight attendants, and two flight crewmembers on board. There were no fatalities or serious injuries. There were 12 minor injuries. The aircraft sustained substantial damage. The damage exceeded the insurance value and the aircraft was scrapped.

NTSB determined the probable cause of the accident was "...the captain's decision to continue the approach contrary to [airline] standard operating procedures that mandate a go-around when an approach is unstabilized below 500 feet or a ground proximity warning system alert continues below 200 feet above field elevation. The following factors contributed to the accident: (1) the flightcrew's failure to properly complete the in-range checklist, which resulted in a lack of hydraulic pressure to lower the landing gear and deploy the flaps; (2) the flightcrew's failure to perform the landing checklist and confirm that the landing gear was extended; (3) the inadequate remedial actions by [the airline] to ensure adherence to standard operating procedures..."

NTSB then made specific recommendations based upon the accident to the FAA. The following is *FAA Aviation News*' interpretation of the NTSB recommendations that we think are relevant for all pilots. For NTSB's specific recommendations, interested parties can order a copy of the report at the address at the end of this article.

- The need for the most important items on a checklist to be first or highlighted so that the item is not overlooked.
- That operating manuals and training programs include the consequences of improper system operation. In the case of this accident, the crew failed to activate the aircraft's high pressure hydraulic system needed for proper flap and landing gear operation because of improper checklist use. The item was skipped on the checklist because of the captain's distraction during the checklist sequence.
- The need for appropriate questioning in accordance with crew resource management (CRM) techniques of another pilot's action or decision.
- The need for CRM training to recognize the need for "...clear and unambiguous communications of flight-related concerns." In this accident, the crew failed to clearly communicate their respective concerns about the landing.
- That pilots may want to follow the guidance in the FAA report *Human Performance Considerations in the Use and Design of Aircraft Checklists* to see if their checklists meet today's concepts. This might be especially important if your aircraft has one of the older aircraft operating manuals.
- The need for management to ensure that standard operating procedures are followed in the cockpit. The Board found in its investigation of this accident that some of this airline's crews used "line" procedures rather than all of the published procedures. Whether you are a flight department manager, FBO operator, or

flight instructor, it is important to ensure that your respective instructions and procedures are being followed by your pilots, renters, or students.

Based upon the NTSB report findings, we think the key to this accident was the crew's failure to make a go-around when they discovered that something was wrong with their aircraft. The reason the aircraft was not configured properly was because the crew had failed to properly follow their checklist procedures. As the Board pointed out, we think it is important for all pilots to know and understand their aircraft, its operating systems and limitations, and the need to follow safe operating procedures. If something doesn't seem right, pilots should take the time to determine the reason before putting aircraft or lives at risk.

In this accident, the aircraft warning systems provided warnings that the crew ignored or may not have observed. Since the Board determined that there were no mechanical problems with the aircraft, it seems to us that this crew was not prepared to handle a problem of their own making just before landing.

Are you?

The above information was taken from the National Transportation Safety Board's Aircraft Accident Report, PB97-910401, NTSB/AAR-97/01 adopted February 11, 1997. This report may be ordered from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161 (703) 487-4600.

Also available is Advisory Circular 120-51B, Crew Resource Management Training, which can be ordered free from U.S. DOT, Subsequent Distribution Office, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20785.

MAYBE YOU SHOULD TRY SOME FUN FLYING!

By Bruce Edsten

Think about it. How much flying do you do just for the fun of it? Yeah, me too! I guess it sort of falls into the area of establishing our priorities, but the decrease or sometimes outright disappearance of fun flying is serious stuff!

During my frivolously misspent youth (around the last Ice Age but well beyond the Pleistocene Era), a lot of my flying was just for the pure joy of it. Now, however, I have other obligations. The Last National Bank of West Elephant Breath siphons a truly significant percentage of my paycheck. This allows me the dubious privilege of being co-owner of the pile of bricks in which I reside. The other residents there insist on being clothed, fed, transported, and entertained. What I'm trying to say is that I can no longer divert any meaningful fraction of my income into an airplane.

Back around 17 B.C. (Before Children), one of my students and I rebuilt a 1946 J-3 Piper *Cub*. Not being blessed with either a massive payload or a blistering cruise speed, the *Cub* served almost entirely as a fun machine. In fact, we probably had a little too much fun with it. However, the fun flying doubtless served to hone our skills in ways that normal flying never could. How so, you ask?

Well, just think about it. Can you fly more or less straight and level? Can you hold a heading within a few degrees? Excellent! If you can do that for a couple of hours, you could find yourself in St. Louis, MO; Washington, DC; Atlanta, GA, or some other city. When you get there, can you plant your air machine in the appropriate section of the 200 by 8,000-foot hunk of concrete? Splendid! Does that do anything to improve or restore your piloting skills? Probably not much.

Okay, you got a few more hours to put in the log book, but that very often doesn't mean much! There are folks who have a thousand hours of experience, and there are folks who have one hour of experience a thousand times! Most of us fall somewhere in between. The question is: Where are you?

It could be that your flying is becoming sufficiently routine that you are becoming less proficient with increased flying time! Okay, okay. I know that part of the reason you got your license in the first place was so you could go anywhere at the drop of a hat, so droning along straight and level is what you do to get there. But is that all you do?

I no longer have the *Cub* (sniffle) but every once in a while I am lucky enough to sample that kind of flying again. It brings back lots of fond memories. For example, around the Minneapolis-St. Paul metroplex, where the *Cub* was reborn, there were more little grass strips than you could count, including one located beneath a set of high voltage powerlines. No go-arounds. You got it right or else! (In most cases, the power lines were short enough that you still had to get it right or else!) The little *Cub* never got to them all, but it got to a bunch of them. And it was definitely good experience.

When was the last time you did a short field landing? Did you ever do a really challenging short field landing during your training? What would happen if the fan up front were to "pack it in" and you had to land in that little alfalfa field down below—or else?

The point here is that you might want to do a bit of fun flying from time to time just to get those juices flowing again. And you don't need a *Cub* or grass strips to do the job, either.

If your own flying skills have deteriorated to the point where you would not feel confident trying something unusual, then you have all the more reason to do just that! Rather than go off someplace and scare yourself silly, though, you probably should enlist the services of an instructor. And then what?

Well, there are those three general areas of proficiency that we have found to be the most wanting—takeoffs and landings; airwork, particularly slow flight, steep turns, and stalls; and basic instrument work. It is felt that increasing every pilot's proficiency in these areas would just about eliminate accidents. If this sounds like the three hours of dual flight instruction you need to qualify for a set of WINGS, it should! That's exactly what it is. You can get more information about the Pilot Proficiency Award Program (WINGS) from Advisory Circular AC 61-91.

My *Cub* was so forgiving that it could land quite easily on any of the wheels, one at a time, including the tailwheel! (That's a tough one, doing a touch-and-go with only the tailwheel, but it can be done.) I made nearly 30 attempts before I succeeded, and I was able to do it consistently only half the time.

Would you imagine that it was an extremely fine balance of pitch and power that resulted in exactly the right attitude that would roll the tailwheel on the runway but not the mains? Yup! And that's the whole point—finely honing the flying skills. A touch-and-go on one or the other of the mains was a lot easier, even when we included a thousand-foot roll on just one wheel before going back into the air.

It sounds like airshow stuff, I guess, and that's where we got in a little trouble with the airport management. They thought we were having a bit too much fun. The *Cub*'s red, white, and blue Thunderbird-style paint job didn't help, I suppose. Anyhow, management more or less politely suggested that we do our fancy stuff elsewhere, though they happily accepted our hangar rent and gas money.

H. Dean Chamberlain photo

Does this all sound a bit beyond you and your regular mount? Maybe in terms of the specifics but not the generalities! For instance, your Cessna 150 will be less than happy if you attempt to roll just one main down the runway. Why? Because the gear is somewhat wider than the *Cub* and, more importantly, it's a "nosedragger," not a taildragger. And whatever you do, don't try to repeat my tailwheel trick with your nosewheel!

However, there are some maneuvers you can do in the 150 that you can't do in a *Cub*. How about a full-flap landing, during which you roll out, retract the flaps, and complete the touch-and-go, while never allowing the nosewheel to touch the ground? That takes some practice, too! How about power-off landings from a point abeam the touchdown zone? It's an excellent energy management exercise and good practice for that alfalfa field you never want to land in.

Straight and level? Can you do it with the stall warning activated? Having achieved that, keep the stall warning on and climb, descend, and make 30-degree banked turns. Then go back and do it all again with the full range of flap settings. Challenging? Once again, that's the whole idea!

You may never come to like stalls but you most certainly should get to the point where you are at least comfortable doing them. And you may enjoy the challenge enough that the stalls become secondary. How about a full flap, power-on stall while holding the heading within 10 degrees? Altitude loss less than 100 feet?

Well, I guess I could go on and on, but the point is that you really ought to challenge yourself a bit, open up your personal performance envelope, and have some FUN! Best of all, you will become a better pilot in the process.

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This article originally appeared in the "Accident Prevention Program Newsletter," published by the FAA's Louisville(KY) Flight Standards District Office. The author is a Safety Program Manager at the FSDO.

In the Hangar

INVALUABLE SPIN TRAINING

by Patricia Mattison

Pilots reading this article who have had spin recovery training, raise your hands. That's right, go ahead, raise your hands. Now that you feel perfectly silly, you can count yourself among the special few whose flight instructor chose to enhance your skills through spin recovery training.

Because flight instructors must receive training in spin recovery technique before taking their practical test to become instructors, some instructors give basic stall/spin recovery technique instruction to their students before first solo, even though the FAR do not require it. Spin recovery was a mandatory part of basic flight training until the late 1940's when newly designed aircraft were thought to be spin proof. Also, a high incidence of accidents during spin training had the then CAA rethink that requirement for primary students. The emphasis was switched to stall recognition and recovery. Today, stalls and the resulting spin account for about 30% of all general aviation fatalities.

A stall can occur anytime that the wing stalls, at any airspeed or at any attitude. All aircraft must be near aerodynamic stall for a spin to develop. In light, training aircraft, a spin is usually preceded by a stall. In straight-winged aircraft, a stall must exist for a spin to develop. A spin results from stalling the aircraft and failing to add rudder or aileron in the correct direction. Excessive aft center of gravity also can be a contributing factor. Consider the following scenario.

A pilot has just filed a flight plan to a city some distance away. The weather reports the pilot received were for good weather below an overcast, with possible snow showers later in the day. Feeling that the weather was good enough to go, the pilot loaded the airplane (without doing a proper weight and balance) and left for the destination.

The instrument rated pilot had not had any actual weather flying experience in a few years. Meeting the currency requirement to fly with a view restricting device for six hours every six months was sufficient as far as he was concerned. All of that practice instrument flight time was in smooth air over known terrain. This flight would take the pilot into unknown terrain and possibly bad weather, including the potential for snow showers.

The first part of the flight was uneventful. Close to the destination, twilight turned into a dark moonless night. With only a few miles to go, it began to snow—at first gently and then progressively harder and harder—until the pilot was in a white-out condition. There was no ground reference at all, and the glare of the aircraft lights off the falling snow made it impossible to see anything forward of the plane's nose.

Focusing all attention on the instruments, the pilot started the instrument approach to the destination airport. The pilot could see snow streaking past the airplane window with peripheral vision. Concentrate, concentrate. The only way to fly safely through this snowstorm was to trust the instruments and concentrate on the job at hand. The pilot glanced up and out the windscreen ever so briefly, but it was long enough to fool the pilot's senses. The pilot felt that the plane was turning right and corrected to the left.

The aircraft entered a left turn that became increasingly steep. When the aircraft came out of the bottom of the snow shower and the pilot could see the ground, he panicked. Realizing the airplane was about to crash, the pilot pulled back on the controls, causing the aircraft to stall. The pilot had loaded the aircraft aft of center, which made the aircraft less stable, and a spin resulted. The ensuing stall/spin would have culminated in a fatal crash if this were a real situation.

The moral of the story is that the pilot should have loaded the airplane within the center of gravity resulting in more stability and better control. In addition, flying into an area of possible bad weather takes planning and instrument currency on the part of the pilot. In the case of a non-instrument rated pilot, the result would have most assuredly been fatal.

If you have not had spin recovery training, consider getting some from a qualified instructor or aerobatic school. You may want an instrument rating on your certificate and, when you get rated, practice, practice, practice.

Ms. Mattison is the Safety Program Manager at FAA Juneau (AK) Flight Standards District Office.

New FAA Internet Web Site for FAR Part 61 Q&A's

Do you have a question about the new FAR Part 61? If you do, maybe your question has already been answered. You can review the latest FAR Part 61 questions and answers at the following FAA web site.

The site's URL is www.mmac.jccbi.gov/afs/afs600 The site provides current FAA policy and guidance on the new FAR Part 61 which became effective August 4, 1997. The site is updated weekly.

SUN 'N FUN 1998 by H. Dean Chamberlain

The "Spring Celebration of Flight," the week-long Sun 'n Fun EAA Fly-In in Lakeland, FL, is April 19-25. If you are planning on attending the 24th annual event, you are rapidly running out of time to make your plans and reservations. Like in past years, FAA has issued a special Air Traffic Management Plan Notice to Airmen (NOTAM) for the event. The NOTAM provides detailed arrival and departure procedures for aircraft flying to and in the Lakeland area from April 17 through 25. Note the special procedures start two days before Sun 'n Fun's opening day.

FAA SUN 'N FUN NOTAM, VIDEO, AND FREQUENCY CARD

In addition to the NOTAM, the FAA's Office of System Safety has produced a video and frequency card highlighting the procedures outlined in the NOTAM. For a copy of the NOTAM, frequency card, and video you can call (941) 644-2431. You can also borrow a copy of the video from you local Flight Standards District Office (FSDO) by contacting your local FAA Safety Program Manager at the FSDO. Sun 'n Fun information was published in the Special Airshow Section of the February 27 FAA Notices to Airmen publication. It will also be in the March 27 issue.

Even if you have flown to Sun 'n Fun in the past, you will still need to review the NOTAM for any changes. This year there is a temporary tower at the Plant City Airport. You also need to check the list of radio frequencies for changes.

If you have never flown to Sun 'n Fun, you especially need to get a copy of the NOTAM and study it in detail. You should also try to review a copy of the video. If you are a first time flight arrival, finding yourself number 10 in trail to enter the traffic pattern is not the time to wonder what is going to happen next.

Although the arrival and departure procedures are not complicated, they do need to be understood very well. The procedures are designed to move hundreds of aircraft safely, quickly, and predictably in and out of Lakeland by having both pilots and controllers follow the same published procedures. Knowing and following the published procedures are especially important in the case of an emergency at Lakeland or one of the outlying airports.

Another important operational procedure is the limited use of radio communications to control aircraft landing or departing Lakeland. The NOTAM outlines when pilots should communicate and when they should monitor. Strict compliance with the published communication procedures will avoid any unnecessary frequency congestion while speeding up the landing or departure process. But every pilot should contact ATC immediately if there is any question of safety of flight or in case of an emergency. Pilots should also remember some of the aircraft flying to and from Lakeland don't have radios. The NOTAM has a procedures section for no-radio aircraft. The NOTAM also has special sections for both IFR and VFR pilots.

VFR pilots should pay particular attention to the airspace information given because of the proximity of the Tampa and Orlando Class B airspaces. Special procedures will permit aircraft without a transponder to fly in designated areas of the Tampa and Orlando Mode C Veils. The NOTAM has the details.

WAYS TO MINIMIZE RISK OF MIDAIR COLLISION

All pilots need to pay attention to other traffic as they approach the Lakeland area. Since there is such a performance mix among the different types of aircraft flying to, through, or in the Lakeland area, there is an increased mid-air collision risk. One way to reduce that risk is to fly with your landing lights and beacon or strobe lights on within 30 miles of Lakeland. If you are flying on an airway, you might want to extend that lights-on distance. Pilots need to be alert for traffic from any direction when approaching Lakeland. You can also monitor the appropriate ATC frequencies listed in the NOTAM. Everyone should also use the appropriate altitude for your direction and type of flight, IFR or VFR.

ELT MONITORING EN ROUTE

Pilots flying to and from Lakeland should periodically monitor 121.5 MHz en route to check for any activated emergency locator transmitters (ELT). If you detect an ELT signal, contact the appropriate air traffic control facility responsible for the area you are in with the information.

EXTRA FUEL

Because of the potential delay with so many aircraft operating at Lakeland, including the risk of an accident on the field closing the airport for a while, all pilots should make sure they have enough extra fuel on board for the flight including the appropriate IFR or VFR minimums plus enough fuel for an in-flight hold of at least 30 minutes or more. This is a case where the more fuel, the better. Stay within your approved weight and balance limitations.

In addition to allowing yourself extra fuel, VFR flights should extend their projected flight plans by 30 minutes to compensate for any unexpected delays because of traffic.

All pilots should review the flight plan filing and closing procedures in the NOTAM.

MAINTAINING SAFE FLYING SPEEDS

Because of the mix of traffic, all pilots might want to practice flying their aircraft at minimum safe airspeed. Whether you do it at home on a practice flight or en route to Lakeland, you should be able to control your aircraft safely at its slowest recommended airspeed, its normally recommended airspeed, and at a faster than normal air-

speed. The reason is you may be mixed in with other aircraft that may be slower or faster than you. You may also need to be able to maintain your place in trail of other aircraft. But as the NOTAM states, if you cannot safely reduce airspeed to follow slower traffic, inform ATC and do not, we repeat, do not fly at any airspeed that jeopardizes your safety of flight.

The NOTAM explains in detail with charts and text the modified VFR arrival procedures in effect at Lakeland. All pilots need to review these procedures before arriving in the Lakeland general area because even IFR flights may be directed to follow the VFR procedures when the weather is VFR at the airport.

Because of the various planned flight activities during Sun 'n Fun and the special operating restrictions including when the airport is closed because of the daily airshow, all pilots need to review the NOTAM for such items as airport operating hours, arrival altitudes, airspeeds, airport surface operating procedures, airport safety notes, parking notes, and other operating procedures listed in the NOTAM.

ELT CHECK

After landing and before securing your aircraft, all pilots in radio equipped aircraft should do a final radio check on 121.5 MHz to check for inadvertent ELT activation. With the large number of aircraft attending Sun 'n Fun, you can imagine the difficulty in finding the source of an ELT signal.

FAA SAFETY CENTER—WEATHER TO GO

While at Sun 'n Fun, visit the FAA's Safety Center for all your aviation needs. The FAA Safety Center has Flight Service Station specialists available for your weather and flight planning needs, Flight Standards aviation safety inspectors from the Orlando FSDO to answer your piloting or airworthiness questions or to issue certain certificates, various FAA displays and exhibits as well as an ongoing schedule of FAA and industry safety presentations. Many of the presentations are given by nationally known aviation speakers.

Below is the schedule of FAA Forum presentations. The FAA Safety Center Forum area and Production Studios open daily at 8 am. For those who arrive early, the first day of Forum presentations starts on April 18, the day before Sun 'n Fun officially starts. In addition, for those who cannot attend a safety presentation, many of the presentations will be locally broadcast within the airport area by Sun 'n Fun Radio, WPEP 788 at 1610 on your AM dial.

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Mining crews stationed at an isolated lake were going to a nearby town for a crew change. The lake is surrounded by 700- to 1000-foot mountains. The takeoff/landing distance is about two km in an east-west direction. Conditions on this day were conducive to serious carb icing—the temperature was 13° with a dew point of 12°. Winds were from the south-southwest at 10-15 kt.

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CALENDAR OF EVENTS

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CALLSIGN CONFUSION

by Bob Wright
with Marcia Patten

"We were operating about one hour late which put us in XYZ area at the same time as [company flight] 552. Our number was 522. Controller cleared 522 direct, descend and maintain 4,000...I acknowledged and we complied. We had not heard 552 on frequency yet. Nor had we heard him respond to the same clearance. We had blocked each other and not known it until a phone conversation later. Suddenly, the Controller said, '552, Where are you going?' 552 [replied], 'You cleared us direct down to 4,000.' ATC was silent for about 10 seconds, seemed longer...A target showed on TCAS at 12:00 o'clock, 2,000 feet below us. If [we had] continued we would have had a near midair. ATC continued to give both 522 and 552 a lot of strange vectors—obviously for traffic. I queried ATC about it and he said, 'You guys keep getting your flight numbers mixed up.' I know he said 522 in the original clearance, but he meant it for 552. Also 552 was expecting that clearance, so he responded. In retrospect, it was strange that we would be cleared from 9,000 to 4,000 in such a high density area. I thought maybe the traffic was light at that time."

The Captain of Flight 522 adds:

"No matter how it happened, this is a classic illustration of how dangerous similar callsigns can be and how a very simple slip by a pilot or controller could result in disaster. My personal feeling is that, given the number of similar callsigns that I hear, my company does not work very hard at 'deconflicting' them...The current efforts still leave many problems out there looking for the worst possible time to happen."

"If I Called the Wrong Number, Why did you Answer the Phone?"

No one factor "causes" the situations reported here. Rather, as can be seen in the above report, a combination of factors on both sides of the radio leads to incidents. The purpose of this article is to inform readers where aircraft callsigns come from and how similar callsigns can complicate communication.

Innumerable Numbers

The Aviation Safety Reporting System (ASRS) receives a large number of reports regarding callsign similarities and confusion, as air traffic and radio transmissions increase. Most reports indicate only momentary confusion or minor infractions of a clearance. Others relate incidents as severe as near midair collisions (NMAC) or serious losses of separation.

Numbers are always a potential problem in aviation as they can refer to altitudes, airspeeds, headings, frequencies, transponder codes, flight numbers, or various other flight elements. ATC instructions full of numbers are often delivered rapid-fire, received and read back by a pilot in a noisy cockpit then heard and accepted by a harried and hurried controller. At some time in their careers, most pilots have been waylaid by all the numbers in a clearance; i.e.:

"Aircraft 46261, cleared for takeoff runway 26, wind 250 at 16 knots, turn left heading 210, climb to 2,600 feet squawk 1216, contact departure on 126.2."

Letters may pose a problem, too. B, C, D, E, G, P, T, V, and Z are the largest group of letters that can be easily misheard. Other similar-sounding letters include M and N, I and Y, F and S, and A, J, and K. Proper use of the phonetic alphabet can eliminate much of the confusion of similar sounds. Still, similar-sound words may be misunderstood, especially when transposed; for example, Delta Alpha and Alpha Delta and Kilo Echo and Echo Kilo.

Take a Number, Please

Where do aircraft numbers come from? FBO's, general aviation aircraft, and most non-scheduled air taxis use the aircraft tail numbers or N-numbers as their radio callsigns. Most scheduled air taxis and air carrier airlines use flight numbers rather than N-numbers as their callsigns.

The FAA does not assign the flight numbers used by most air carriers and commuters. If it did take on this task, it would probably have as much difficulty as the air carriers themselves. Assignment of flight numbers is typically a function of the airline's marketing department. Sometimes it appears that Marketing chooses the quickest, easiest method of assigning numbers to newly created flights. Consequently, some flight numbers have only one number that is different, some have numbers that are transposed, some just happen to sound similar, even though they may contain few, if any of the same numbers. This problem appears to be increasing, as airline mergers and buyouts have led to operators blending flights under the same carrier name but with a decreasing pool of available flight numbers.

For example, air carrier A buys commuter B and gains 30 new flights per day. The easiest way to assign flight numbers is to take a block of unused numbers, say 4101-4130, and assign those numbers in order of departure time. Often odd numbers are assigned to one compass direction and even numbers assigned to the opposite direction. This can apply to north-south flights and to east-west

flights. So, for our fictitious air carrier A, SFO-PDX flights could be 4101, 4103, 4105, etc., and PDX-SFO flights could be 4102, 4104, 4106, etc. If air carrier C, which may also have undergone mergers, also has flights to and from PDX or SEA at approximately the same times using the same or similar block of numbers, there is a potential for major confusion while these aircraft are sharing the same airspace.

The FAA does assign aircraft tail numbers. Usually the numbers are assigned at random. However, owners or operators of corporate, FBO, or air taxi aircraft may request specific or "personalized" N-numbers, like many state vehicle license (or "vanity") plates. The result can be a whole family of aircraft with similar or similar-sounding numbers and letters. These aircraft look very impressive sitting all in a row on the ramp, but their numbers can create a nightmare for both pilots and controllers if several of the aircraft depart in the same direction at the same time.

What is Similar?

"Similar" generally means having a resemblance to one another or to something else or like but not completely identical.

What seems or sounds similar to one person may not sound similar to another. Hence, a pilot may be utterly confused about which aircraft a controller is giving instructions to while the controller is frustrated and impatient with the pilot's hesitation or failure to comply with an instruction. What sounds similar to a pilot in a noisy cockpit may not appear to be a problem to a controller looking at a radar scope. Likewise, a controller looking at flights 404, 1441, and 4124 on flight progress strips or a radar screen may feel muddled with all the similar numbers, while the pilots of these flights may not have any trouble hearing their respective flight numbers called out to them.

Aircraft with similar callsigns arriving or departing a destination at the same time sets the stage for a mix-up. Even with a thorough understanding of the potential for confusion, the Captain admits to being caught off-guard on occasion:

"Every morning, air carrier A flight 123 leaves [one airport] while air carrier B flight 123 leaves [a nearby airport], both headed for the same destination...Both flight crews of both flights have been aware and alert for the obvious probable problems of this situation. In spite of their alertness, at least a dozen clearances to one of the aircraft have been read back or at least questioned by the other. On one occasion, the wrong aircraft left its cruise altitude based on the clearance intended for the other."

From his recommendation, it sounds as if the Captain has given up on company avenues and is seeking ATC intervention:

"If the operators cannot prevent this type of situation, each ATC Center should not accept two or more aircraft with the same numbers in the callsign."

Similar Numbers + Human Error = Callsign Confusion

Although the callsign problem originates in the management arena, flight crews and controllers add human error to the equation. Any number of human factors can combine to cause miscommunication.

Say What?

Overall radio and communication technique appears to be a major contributor to callsign confusion. Use of an abbreviated callsign, although a common practice and completely legal, can invite a misunderstanding. Related to the communication technique is the issue of readback/hearback, frequently cited in reports of callsign confusion. Often this is a case of selective listening—a pilot's expectation of a particular clearance and a controller's expectation of a correct clearance readback.

"Operating flight 961, we received and acknowledged a clearance...A few minutes late a flight 691 received and read back the same clearance. I commented on the similar callsigns and asked the other crewmembers to listen carefully. A short time later, the Controller...asked us to stop our descent...and said something to the effect, 'I believe that clearance was for another aircraft.' Nothing more was said on the radio and there appeared to be no conflict.

"This is a classic example of the confusion that arises when there are similar callsigns in the same airspace. Everyone hears what they expect to hear. If the controller misstates a callsign, he probably will expect to hear a readback from the aircraft he intended to address and the mistaken readback will not register. If a pilot is expecting a clearance, he can mis-hear a callsign. I have heard more errors recently involving the transposition of callsigns (961 versus 691) than errors between similar sounding callsigns (1468 versus 468). Everyone must listen carefully to clearances and readback and, to the extent possible, the airlines must try to separate similar callsigns."

Too Busy to Listen

Workload and fatigue, particularly in bad weather, can take their toll on people's ability to concentrate and perform to the usual standards. For flight crews, fatigue can be the culmination of schedule pressures, long days, and multiple takeoffs and landings at the same airport with quick turnarounds. The addition of frequency congestion can seriously muddle communication.

"There were three aircraft on frequency with similar sounding callsigns. We had all been 'stepping on' each other's radio transmissions and on Center. The callsign of the other aircraft was very similar to our callsign on our [previous] leg (this was our seventh and last leg of the day)."

High traffic volume, the presence of airline hubs, and combined position operation (for example, working ground and tower simultaneously) can over-

load ATC personnel and leave pilots frustrated, as the next report illustrates:

"I believe the Controller was working two frequencies and the fact that there were similar flight numbers on each frequency were the contributing factors. Controllers working separate frequencies make it very difficult for us to maintain as high a situational awareness as we could. On a single frequency we are able to hear if another flight answers the Controller's instructions when we think the instructions are for us. That raises the question in our minds and we are able to ask, 'Was that last call for us.?' Similar flight numbers, be it on a single frequency or separate frequencies, are a major drawback."

Juggling Act

Modern electronics—GPWS, TCAS, FMS, and ACARS, for example —abound in an aircraft cockpit. All that complex equipment, as well as cockpit checklists, company communications, and PA announcements, may produce additional distractions for pilots trying to listen for critical radio transmissions. A Captain provides an example of distraction and divided attention:

"The copilot...turned the radios over to me so he could do a passenger announcement. I acknowledged a frequency change. I then checked in to the new frequency, using the callsign of my previous flight. The Controller, who I think was expecting me, gave me a clearance for the correct callsign. I acknowledged, apologized for the mistake, and continued without incident. In retrospect, I feel I was too quick to accept the clearance. I could have easily taken someone else's clearance...You lose your system of double check when one pilot is off the air getting ATIS, doing a passenger announcement, or talking with company."

Confusion Conclusions

- **Phraseology.** Communications technique is still pilots' and controllers' primary defense. Use of proper phraseology with full callsigns in every radio transmission can eliminate many of the types of miscommunications cited here.
- **Attention Management.** Attentiveness to radio traffic and timeliness of transmissions can ease frequency congestion.
- **Cockpit Communication.** Communication within the cockpit can be critical—all crewmembers need to be "in the loop" at high workload times or during crucial radio communications to prevent readback/hearback errors. Whenever there is doubt about a clearance or instruction, crews should clarify the matter among themselves and with ATC.
- **Procedures.** Adherence to procedures can also play a major role in alleviating callsign confusion. Careful readback and confirmation of clearance are all-important. Pilots and controllers both need to question transmissions that are out of the ordinary or don't sound "right" and ask for a repeat if a transmission is not clear or may have been stepped on.
- **Technical Solutions.** Technical improvements may help some aspects of the problem. Pre-Departure Clearances (PDC) have cut down somewhat on congestion of the clearance delivery frequencies, but the[re is not] a system for confirmation of acknowledgement of the correct clearance being correctly received by the flight crew. Data Link may improve problems related to frequency congestion, blocked transmissions, speech rate, foreign and regional accents, and pronunciation (manner of speech) and enunciation (speaking distinctly or with clarity). Human error can still occur, however, in keying the input into the Data Link system or in trying to read a poorly lit ACARS screen or poor quality print-out.
- **Company Policy**. Company planning and marketing departments in all segments of aviation need to be mindful of the potential for callsign confusion
  - For air assigning a new block of flight numbers, a quick check of the Official Airline guide might help determine if conflict exist with other aircraft using similar numbers along the same routes or into and out of airports at the same time. Coordination between a company and its regional affiliates can eliminate a situation such as Company B 454 and Company B Express 1454 arriving at the same time at the same destination.
  - For non-air carriers using sequential tail numbers or transposed tail numbers (e.g., 58SH/68SH or 404SH/404HS), a request for assignment of less-confusing but still meaningful N-numbers might be an option.

Dealing with Conflict

Currently, pilots can go through channels within their companies to request changes for numbers that are a problem. Pilots might also consider taking this issue to ALPA or ATA to bring attention to the situation in an industry-wide forum. This might encourage more coordination between airline companies.

Controllers have the option of talking to their supervisors about ongoing problems with similar callsigns, and the supervisors can take a case to airline representatives. But there is no promise of action.

Pilots and controllers need to continue to bring callsign problems to the attention of management, and, as always, all are encouraged to submit reports to ASRS.

Mr. Wright is Chief Analyst for ASRS and Ms. Patten is the Associate Editor of ASRS' publication Directline, from whose June 1996 issue this article was taken.

• FAR Part 61 Change

Why did the FAA change the rule on centerline thrust aircraft in FAR Part 61?

Name withheld

When the new FAR Part 61 became effective on August 4, 1997, one of its changes required that a pilot provide an aircraft for a practical test that could meet all of the practical test requirements for a particular pilot or flight instructor certificate. For multiengine pilot applicants this meant they had to now provide a multiengine aircraft that had a published minimum control speed for the test.

In the past, pilots who used an aircraft for a multiengine practical test that didn't have a published minimum control speed such as a Cessna 337 model would receive an operating limitation on their pilot certificate upon successful completion of their practical test that restricted them to operating only similar centerline thrust aircraft.

The same was true of military pilots applying for a civil certificate based upon their military training in aircraft with no published minimum control speed. They too would receive a centerline thrust limitation. These limitations would remain in effect until the pilot passed a certification test in a multiengine aircraft with a published minimum control speed. FAA has now changed back to its old policy.

The new FAR § 61.45(b) reinstates the policy of allowing pilots to take a multiengine practical test in an aircraft without a published minimum control speed. Pilots will now receive an operating limitation on their certificate upon successful completion of the practical test that limits the applicant to that specific aircraft type (i.e. "limited to CE-336/337 only").

The limitation will remain in effect until the pilot takes and successfully passes a practical test in a multiengine aircraft with a published minimum control speed.

This same change in policy will also apply to other aircraft with operating limitations that don't meet all of the test requirements of the appropriate practical test standards.

Pilots taking practical tests in such aircraft will receive an appropriate operating limitation on their certificates until they take and pass the appropriate practical test in an aircraft without the operating limitation.

• Birds, Deer, and Warning Devices

In the Flight Forum section of *FAA Aviation News* (March 1997), Doug Mason inquired if ultrasonics could be used to repel birds and other wildlife away from aircraft. This is a frequently asked question and the answer, unfortunately, is an emphatic "No!"

First, birds hear in about the same frequency range as humans so they do not hear ultrasonic (greater than 20,000 cps) frequencies. Our laboratory has done research showing birds are not influenced by ultrasonics.

Second, even if they did hear these frequencies, high-frequency sounds attenuate very rapidly, making it impractical to cover enough distance to alert birds in time to a rapidly approaching aircraft. With regard to deer, research also has shown that the high-frequency deer whistles mounted on automobiles do not reduce deer strikes

Bird strikes are a serious problem costing civil aviation over $150 million per year and the occasional loss of human life. Research is underway in a number of areas to combat this threat.

One promising approach involves "pulsed microwave radiation" to alert birds to approaching aircraft (see *Aviation Week and Space Technology*, 10 March 1997, pages 65-66).

I would like to take this opportunity to remind all pilots to report bird and other wildlife strikes on FAA Form 5200-7. This information is extremely useful to researchers and managers as we search for effective solutions to this growing problem.

Richard A. Dolbeer, PhD
US Department of Agriculture,
Sandusky, OH

Thanks for the information.

• The Wright Stuff on Wildlife Strikes

The article "Operation at Nontowered Airports-Uncontrolled Aviation?" (March 1997) was a good start toward making pilots aware of the safety issues at these airports and the importance of communicating with one another.

As the manager of FAA's Wildlife Strike Database, I would like to add a safety suggestion or two along these lines. When approaching nontowered airports at dawn, dusk, or night when light conditions are low, pilots should fly over the airport to check for wildlife. For departures, pilots should keep a lookout for birds and deer.

You might want to make a preliminary trip down the runway making "S" turns to check for animals before departing. Deer are especially active at twilight and at night (see "Watch Out for Rudolph!" Nov/Dec 1996). When you see wildlife on or near the runway, don't take off or land until they are gone. Also warn other pilots in the vicinity of the problem.

Sandy Wright
US Department of Agriculture
Sandusky, OH

Thanks for the information. During low light conditions at airports with animals or birds nearby, all pilots need to be mentally prepared to abort the takeoff or, if landing, go around in case a deer or other animal is on the runway. Pilots have also had accidents trying to avoid an animal or birds.

• Checklist Checkup

Your September article "Where Are You Going to Put It?" is a valuable review of emergency landing procedures, but the Engine Failure Checklist contains a dangerous misconception. The entry "Fuel selector-Fullest tank" should read "-Change tanks." The engine malfunction may be due to a tank that stops feeding due to mechanical or contamination factors, rendering it useless no matter how full. It is always worthwhile to try an alternate tank. U.S. Air Force has long taught this concept, and it should be adopted for any aircraft that uses "either/or" fuel feed. Thank you for an interesting, valuable publication.

Stephen F. Riethof, CFIA&I
Haworth, NJ

Thanks for your comment. As indicated in the article, pilots are expected to follow their aircraft's appropriate pilot's operating manual, aircraft flight manual, or owner's manual for proper operating procedures and limitations (FAR § 91.9, Civil aircraft flight manual, marking, and placard requirements). However, pilots may under FAR § 91.3, Responsibility and authority of the pilot in command, subpart (b) "In an in-flight emergency requiring immediate action, the pilot in command may deviate from any rule of this part to the extent required to meet that emergency."

FAA AVIATION NEWS welcomes comments. We may edit letters for style and/or length. If we have more than one letter on the same topic, we will select one representative letter to publish. Because of our publishing schedules, responses may not appear for several issues. We do not print anonymous letters, but we do withhold names or send personal replies upon request. Readers are reminded that questions dealing with immediate FAA operational issues should be referred to their local Flight Standards District Office or Air Traffic facility. Send letters to FORUM Editor, FAA AVIATION NEWS, AFS-805, 800 Independence Ave., SW, Washington, DC 20591, or FAX them to (202) 267-9463;. e-mail address: Dean.Chamberlain@faa.dot.gov

• Disks

Regarding GPS usage and computerized instrument approach charts on CD-ROM, I have been tracking this, and similar developments for some time. A good knowledge of computer technology has been a professional necessity during my (ongoing) 40 years of engineering science endeavors. However, as a current, instrument-rated pilot with many hours in the "gunk," I have not been able to figure out how such technology can be safely used during flight in a small private plane which does not have equipment such as the TSO'd flight directors used on larger craft. Consider the following scenarios:

1. Suppose I used my desktop or laptop at home or office to print out the approach plates for all the expected and unexpected airports along a particular flight route. During the flight, the weather changes suddenly (not as forecast) so that we need to quickly seek alternate airport, with an instrument approach, as soon as possible. The only airport recommended for this by ATC is, say, Many, LA. But I didn't dream I'd need to land there, so, of course, I didn't print the plates(s). On the other hand, if I'd been carrying ALL of the JEPP or NOS plates for ALL of the airports in that section of the country, I would not have "been in trouble." (This unexpected event happened to me twice: once near Shreveport, LA and once coming into the City of Quebec. But I always carry ALL the JEPP plates for the areas of the countries over which I fly.)

2. I have a new, top-of-the-line notebook computer with a 1.3 GB hard disc, Pentium processor, CD-ROM, and a large, bright, clear, 12-inch color monitor display; the lithium battery can last for seven hours. It is currently running Windows 95, but could just as well been running on Windows NT. So perhaps

I could use this in the cockpit. My wife is very good with computers, so she could run it to bring up the approach plate for a particular instrument landing. Or, I could rig a special holder for the computer for the times when I fly alone. Of course, I would have to greatly enlarge my scan to include the plate displayed to my right. Well, I wouldn't do this for all the money in the world! I have been using, and even designing computers since about 1958, and no laptop computer running a multi-tasking operating system with any form of Windows is reliable enough for this job. None of the computer hardware, made for business and home purposes, is reliable enough. Also, when one is making an approach to minimums, there is absolutely no time available to "mess" with a computer!

For small planes, I don't see any type of replacement for the PAPER instrument approach plates which are clipped to the yoke or in the pilot's lap!

CD-ROM's should be updated frequently, as are the JEPP and NOS plates by subscription, and the databases for GPS and Loran receivers. Paying for my JEPP and Loran updates is enough!

It seems to me that the people who are purveying the CD-ROM approach plate concept might need to do a little more thinking about safety, and get a little more experience making approaches in low IFR weather in small planes.

Thank you for your forbearance, I decided that it was time to quit writing just as I was really warming up to the subject.

James H. Moser
(I own and fly a Piper *Turbo Dakota*)
Via Internet

Your comments about electronic approach plates on disk identify issues that will have to be resolved for small aircraft usage.

FAA REDUCES ALCOHOL TESTING RATE FOR INDUSTRY EMPLOYEES

Over the past three years since the requirement for random alcohol testing of aviation industry employees, less than one-half of one percent have tested positive. Only employees in safety and security-related jobs were subject to the testing requirement.

Because of the low violation rates, FAA is lowering the current minimum annual random test rate from 25% of employees to 10% for calender year 1998. In 1995, the first year random alcohol testing was required, approximately .06% of employees tested tested positive for alcohol. That percentage was .08% for 1996. Figures for 1997 are not yet available, and the minimum testing rate of 25% for the drug testing program will remain at its current level for 1998. The regulation allows the FAA to reduce the minimum rate for testing if the violation rate is less than one-half of one percent for two consecutive years. If the violation rate increases, FAA can raise the test rate again to address the increase; however, FAA feels that a rate of 10% of employees will address the safety concerns for which the regulation was originally enacted.

1997 FAA AMT/NASCAR WINNERS SELECTED

On December 9, 1997 the FAA announced the five top winners of the FAA's Aviation Maintenance Technicians Award Contest. These awards are given as an added incentive and reward for aviation maintenance technicians who pursue continuing education or technical training. The winners were selected from thousands of entries which represented more than 155,000 hours of training during fiscal year 1997.

Atlantic Aero, Inc. is one of the sponsors of the two-year old contest. The winners' names were drawn at the Atlantic Aero facility at Piedmont Triad International Airport at Greensboro, NC. The top prize winner of an all expenses paid trip for two to the March 22, 1998 running of the TranSouth Financial 400 at the Darlington Motor Speedway in South Carolina was Ms. Karen Chadd of Bainbridge, IN. Stan Mackiewicz, President of the Professional Aircraft Maintenance Association (PAMA) picked Ms. Chadd's winning entry. Ms. Chadd is an FAA certificated A&P mechanic employed by Chautauqua Airlines.

From left to right, Mike Hanson, Assistant Manager for Airworthiness, Winston-Salem FSDO; Lee Norvell, National Safety Program Manager for Airworthiness; Phil Randall, Airworthiness Safety Program Manager, Winston-Salem FSDO; and Don Gordon, CEO of Atlantic Aero watch as PAMA President Stan Mackiewicz draws the name of the top prize winner in the 1977 FAA AMT/NASCAR Awards Contest.

Second place—an all expenses paid trip to NASCAR's Winston Cup Driving School—went to Ronald M. Jordan from Litchfield, NH. Mr. Jordan is employed by Delta Airlines. The three third place winners were Jose B. Mairena of San Mateo, CA; William Moret of Plainfield, IN; and Sean A. Reardon of West Newbury, MA. Third place winners received a race team jacket. Mr. Mairena and Mr. Moret are employed by United Airlines, and Mr. Reardon is also employed by Delta Airlines. The winners of 500 fourth place prizes will receive special 1997 FAA AMT/NASCAR tee-shirts.

Mr. Phil Randall, FAA airworthiness safety program manager for the Winston-Salem, NC Flight Standards District Office (FSDO) and the originator of the FAA/NASCAR contest, stated, "Our AMT awards program is working. It is insuring that our AMT's are better trained, more knowledgeable, and, thus, safer workers. The American flying public is the benefactor." At the close of the prize drawing ceremony, Randall added, "Wait until the AMT's see the expanded prize list for the 1998 contest. The entries will quadruple." (All prizes are donated by sponsors and involve no federal funds.)

The deadline for receiving training that will count for the 1998 contest is September 30, 1998. For more information contact the airworthiness safety program manager at your local Flight Standards District Office.

FLIGHT SCHOOL CODE OF CONDUCT

Professional organizations always have a code of conduct or ethics to which its members must adhere in order to remain in good standing and be considered professionals. The National Air Transportation Association (NATA) sees flight schools as no less professional than any other organization providing a service to customers. NATA has developed and distributed to its member flight schools a "Flight School Code of Conduct."

The Code, as NATA calls it, establishes voluntary guidelines for member flight schools to adopt and follow. Among the principles are exhibited respect for students, instilling a dedication to safety, making a concerted effort to raise the quality of training to even higher standards, having ethical management practices, and continually applying common sense and good judgement in all situations.

For further information, contact NATA at 1-800-808-6282.

NATA Code of Conduct

As the grassroots of the aviation community, we consider the effect of our actions and business practices on our customers, our school, and the aviation industry.

Learning to fly allows people to achieve their dreams, become special, and have fun. We strive to maintain the highest standards of safety and a productive, fulfilling learning environment.

As a professional flight school member of the National Air Transportation Association (NATA),

We exhibit respect for students. We foster proactive customer service, and train and motivate our staff to demonstrate the importance of customers to our business.

We instill a dedication to safety, to maintain general aviation's excellent safety record, and to promote that record to the non-flying public.

We encourage and assist all members of the profession, individually and collectively, to raise the quality of flight training in the United States to even higher standards.

We understand that flight schools are service businesses and as such must be operated on sound ethical, management, and financial principles.

We will apply common sense and good judgement to every opportunity we encounter.

AIR CARRIERS TO EQUIP WITH ADVANCED TERRAIN AWARENESS WARNING SYSTEMS

The FAA and the Air Transport Association (ATA) have announced a new partnership to eliminate controlled flight into terrain (CFIT) accidents. CFIT accidents, considered largely in the realm of human factors errors, are a major cause of accidents worldwide.

CFIT accidents occur when an aircraft is under control but pilots lose their sense of where the aircraft is in relation to terrain. CFIT accidents account for about 25% of commercial aviation accidents worldwide in the past decade. A recent example of a CFIT accident is the crash of a U.S. airliner in the mountains near Cali, Colombia.

ATA member airlines will voluntarily equip 4,300 of their aircraft with advanced terrain awareness warning systems, such as the Enhanced Ground Proximity Warning System (EGPWS) Installation of the systems is expected to be substantially complete during 2003. The difference between EGPWS and the GPWS systems in use on airliners for over 20 years is that EGPWS projects possible ground collisions a few minutes into the future. GPWS alerts a pilot with a voice warning, "Pull up! Pull up!" only when collision is imminent. Advanced terrain awareness warning systems provide a detailed moving map of terrain around an aircraft to help pilots maintain proper altitude and terrain clearance. Using global position system (GPS), for example, the aircraft's position correlated with a database-driven terrain map provides real time awareness of current postion and where the aircraft is headed.

The FAA is continuing to develop a regulation that will require advanced terrain awareness warning systems for U.S. carriers. The proposed rule, expected to be published early next year, will mandate installtion of EGPWS in all aircraft with six or more seats in 2003.

FAA Administrator Jane F. Garvey commented, "This is a perfect example of government and the aviation industry working together toward a common goal that will give airline passengers added safety in the skies. This partnership will speed installation of this important safety enhancement and and make it available to the traveling public."

As of mid-December 1997 EGPWS had already been installed in 175 aircraft operated by ATA members. For information, contact Les Dorr, Jr., FAA Office of Public Affairs, (202) 267-8521.

BECOME A MASTER CFI

The National Association of Flight Instructors (NAFI) has introduced a new program to recognize the top instructors in aviation and allows them to enhance their abilities and both pilots and educators. The Master CFI Program will reward continuous professional development and involvement in the aviation community.

To become a Master CFI the flight instructor completes a two-year program of 32 Continuing Education Units (CEU) chosen from a schedule of activities that meet NAFI's credit requirements. In this way, the Master CFI Program encourages both full- and part-time instructors to engage in profession activities that will enhance their teaching skills. Among the ways to accumulate CEU's are attending semi-

nars or institutes that offer professional growth and development, completing college courses that enhance professional growth and development, serving as a high school or college faculty member within the aviation field, writing a book within the professional field, and working as a mentor or supervisor with an individual new to the profession, among others.

The Master CFI designation will be available to any NAFI member in good standing who holds a current flight instructor certificate, ground instructor certificate, or any industy-issued instructor certificate.

For further information, contact Dick Knapinski at (414) 426-6523 or at dknapinski@eaa.org .

NEW YEAR, NEW SECURITY PROCEDURES

This past January 1, new aviation security measures went into effect for operations in the United States. Passenger bag matching has been expanded in accordance with a key recommendation from the White House Commission on Aviation Safety and Security. Also this year airlines will phase-in the use of a new computerized passenger screening program.

Bag matching is a security measure in which a passenger's bags may not be transported unless the passenger is on the flight. It already is done for travelers on international flights and has been done on a limited basis for domestic flights. Expanded bag matching will be based upon both computer and manual passenger screening systems during the transition to fully computerized screening.

A new, Computer-Assisted Passenger Screening (CAPS) program will be used to select baggage for explosives detection examination or expanded bag matching. CAPS uses information from the reservation system to screen out passengers for whom additional security procedures are unnecessary. If not enough is known about a passenger to make a judgement, then additional security measure in the form of explosives detection device screening or bag matching is applied.

CAPS will also select some passengers at random for these additional security measures.

CAPS has been instituted by a few airlines already and will be phased in by other airlines during the year so that the use of CAPS will increase through out the year. The manual bag matching process will then be phased out as CAPS is phased in. As the voluntary use of CAPS is phased in, FAA will issue regulations requiring its use. The proposed rule is currently being drafted and the final rule is targeted for completion this year.

For security reasons, the FAA will not make public the number of passengers who are selected for bag matching nor will we discuss the implementation schedule of CAPS by individual airlines.

KANSAS WINNERS OF EAA "BUILD IT, FLY IT" DESIGN COMPETITION

A team of students from several Kansas universities has won a general aviation design competition that will conclude with the construction and flight of a new airplane design in the summer of 1998.

The team won EAA's "Build It, Fly It" award in the national General Aviation Design Competition, jointly sponsored by the FAA, EAA, and NASA. The Kansas group also received a $10,000 award from EAA. The winning design will be flown at the 1998 EAA Fly-In Convention, July 29-August 4, Oshkosh, WI.

The Kansas team consisted of students from the University of Kansas, Kansas State University, Wichita State University, and Pittsburg State University. The design, named "Aladdin," used the new FJX-2 small turbofan engine and a user-friendly flight control system. The team will build two quarter-scale models of the four-passenger, single-engine aircraft. The models will be used to test the concept and flight characteristics of the design. One will be radio-controlled and the other controlled from a ground station that simulates the pilot's field of view.

CORRECTION

In our November/December 1997 issue we published the excellent article, "Cold Weather Piston Engine Starting," but we supplied some incorrect information about the author. The author is Edmund A. Stanley and, rather than a private pilot, he is a ground instructor; commercial pilot with ASEL, AMEL, and instrument rating; and an A&P mechanic with an inspection authorization. We apologize for the error.

R-22/R-44 SFAR EXTENDED

FAA Adminstrator Jane F. Garvey has signed an extention of the Special Federal Aviation Regulation (SFAR) 73, Robinson R-22/R-44 Special Training and Experience Requirements. SFAR 73 was due to expire last December 31, but the Administrator's signature now extends SFAR 73's additional, specialized training requirements for operators of R-22 and R-44 helicopters to December 31, 2002. The extended SFAR was published in the January 7 edition of *The Federal Register.*

Two changes involving the R-44 have been incorporated into the "new" SFAR 73. The first allows for the crediting of up to 25 R-22 hours toward the 50-hour PIC requirement in § 2(b)(2)(i). Second, 25 R-22 hours can be credited toward the 50-hour CFI requirement in § 2(b)(2)(ii). Previously, all time had to be in the R-44.

For further information, contact FAA's National Resource Specialist for Rotorcraft Operations, Mr. William Wallace, at (202) 267-8212.

Editor's Runway

from the pen of Phyllis-Anne Duncan

A "DO-SOMETHING" AGENCY

As this issue of *FAA Aviation News* was being prepared in mid-December, the National Transportation Safety Board (NTSB) was preparing to hold its public hearings in Baltimore, MD on the July 17, 1996 crash of TWA Flight 800. The Paris-bound flight broke up over the Atlantic shortly after takeoff from New York. Initial eyewitness reports indicated a possibility of sabotage, and the Federal Bureau of Investigation (FBI) was immediately called in to participate in and lead some portions of the investigation. In November 1997, however, the FBI concluded that no evidence existed of a criminal act; i.e., a missile, bomb, or other sabotage. The NTSB knows that the 747's center fuel tank exploded, causing the break-up of the aircraft, but the ignition source of the explosion has yet to be determined. The NTSB will be issuing the probable cause determination some time in 1998.

This accident, because of the nature of the early eyewitnesses, has caused more auxilliaries to various conspiracy theories than could possibly be imagined. For some research I'm doing privately, I peruse frequently the postings of the Internet News Group alt.conspiracy. Comments and new theories on TWA Flight 800 comprise the majority of the postings on a daily basis. (The JFK assassination is still the leader, but it has its own, separate news group.)

Many of the purveyors of the latest "cover-up" or conspiracy notion forget that a couple hundred families still grieve and need closure. When these wild ideas trickle into mainstream media reports, it serves to disrupt survivors' efforts to resolve their losses, and it costs great amounts of time and money to debunk. So convinced are some people that this aircraft was brought down by a missile, that recently two TWA employees and the spouse of one were arrested for allegedly stealing pieces of the wreckage in an attempt to prove that "mysterious" stains on the pieces were missile fuel residue. One of the persons arrested is the author of a hastily written book on the accident that has made the rounds of the various conspiracy-loving groups. While it reads more like an episode of the "X-Files," I dismissed it just a few pages in when I found the first obvious error that could have been corrected with some simple research: The author refers to the "FAA Technical Center in Washington, DC." FAA's Technical Center is, and always has been, in Atlantic City, NJ. If that is a sample of the author's fact-checking....So much for conspiracy theories. They are more entertaining when Agents Mulder and Scully pursue them, not when the families of 230 people want desperately to know what really happened.

The media reports following the November FBI press conference and around the current NTSB hearings have noticeably omitted the FAA's actions to enhance aviation safety and security following the tragic accident involving TWA Flight 800. So, I thought I'd list just a "few." (Our thanks, by the way, to Alison Duquette of FAA's Office of Public Affairs for assembling this fact sheet. You may obtain an electronic copy of the fact sheet from www.faa.gov .)

- Much has been made of the age of the TWA 747 that crashed. Even before the accident, FAA designed and implemented a comprehensive program to ensure the airworthiness of aging aircraft. The program involves stepped-up and more aggressive inspections of older transport category aircraft, focusing on detecting fatigue and corrosion, using corrosion prevention efforts, assessment of structural repairs, and so on. FAA continually conducts research in this area and adjusts requirements as necessary.
- Following the TWA Flight 800 accident a White House Commission issued recommendations for improving aviation safety and security, and the FAA is in the process of implementing all of the Commission's 57 recommendations.
- Immediately following the accident, FAA conducted a comprehensive review of the histories of all 747's in service, including examining every detail of the 747 fuel and electrical systems design and performance.
- FAA has examined Boeing certification data, design assessments, inspection of production and in-service aircraft, and analysed components to explore potential safety issues. This is beyond the normal design review conducted for certification and operation of aircraft in passenger service.
- FAA examined possible ignitions sources as part of the accident investigation, and again although no ignition source has been determined for the TWA 747, FAA did discover a condition with fuel boost pump power wires' shorting. FAA issued a precautionary airworthiness directive (AD) that required installation of sleeving as added protection.
- Less than a month after the accident, FAA issued an AD requiring repetitive inspections and resistance tests of wire

connections on B-747 and 757 fuel pumps. The inspections were completed by July 1997, and about 4% of the pumps had to be replaced.

- In early 1997 FAA issued an AD after postulating a scenario where a short in the fuel boost pump wires could ignite vapor in a wing tank. The 1997 AD required the re-inspection and repair of wiring leading to the number 1 and 4 fuel tank booster pumps in the inboard main fuel tanks of 747's produced before 1980. All affected aircraft have been inspected and the AD requirements met.
- FAA sponsored a three-day Transport Fuel Flammability Conference in October 1997 in Washington, DC.
- The FAA initiated a feasibilty study to examine the possibility of requiring the industry to use lower temperature fuel.
- FAA analysed NTSB's four recommendations issued in December 1996 concerning aircraft design modifications, center wing fuel tank fueling procedures, center wing fuel tank temperatures, and modifying aircraft fuel tanks located near heat sources.
    - In February 1997 FAA's review indicated that controlling fuel temperatures would be difficult to implement and would not preclude the operation of aircraft with flammable fuel vapors in the tanks and determined that there is significant doubt that any amount of fuel added to the center wing fuel tank, as recommended by the NTSB, would lower the temperature to the point where no explosion could occur.
    - FAA conceded that neither the NTSB nor the FAA had sufficient technical or scientific data to establish whether the NTSB's recommendations would enhance safety. The FAA put the recommendations out for public comment for a period that closed on August 1, 1997. FAA is currently reviewing nearly 1,000 pages of comments received and will initiate appropriate follow-up action.
- With FAA support, Boeing issued a service bulletin calling for additional inspections of 747 center wing fuel tanks.
- In November 1997 FAA ordered changes to 747 wiring systems to find and fix conditions that might result in potential ignition sources in or near the center fuel tank.
- The FAA is issuing a Notice of Proposed Rulemaking AD to require the installation of components to suppress electrical transients and/or the installation of wire shielding.
- The FAA is requiring immediate inspection of the scavenge pump wiring on nearly 1,000 747's to detect deteriorated insulation. Pumps with deteriorated insulation must be replaced.
- In December 1997 FAA tasked the government/industry Aviation Rulemaking Advisory Committee to identify methods to improve fuel tank safety.
- FAA responded to the NTSB following NTSB flight tests and explained that while filling the center fuel tank would reduce fuel vapors, and therefore the explosion potential, at the beginning of a flight, fuel vapors would be present for the remainder of the flight as the fuel level in the tank diminished.
- In the short term FAA will reduce the possibility of fuel tank explosions by:
    - Requiring periodic inspection of 747 fuel tanks to detect and correct any anomalous conditions in the tank, wiring, and plumbing that could ignite fuel vapors.
    - Eliminating any specific conditions identified during the accident investigation that could result in ignition sources within 747 fuel tanks.
    - Requiring manufacturers to develop a fuel tank maintenance/inspection program.
    - Requiring operators to have an FAA-approved fuel system maintenance program.
    - Reviewing original certification compliance findings to revalidate the fuel tank design.
    - Requiring an interim action to prevent mechnical fuel pump failures from igniting vapors in the tank via the inlet line until the fuel pump design has been revalidated.

On December 19, as a result of a meeting between Administrator Garvey and NSTB Administrator James Hall, the FAA announced a series of aggressive follow-up steps to address issues raised by the NTSB during its public hearings. Administrator Garvey said, "While the ignition source that triggered the explosion in the center fuel tank may never be pinpointed, it is incumbent on both our agencies to do our utmost not only to improve B-747 safety in the short term but also to deal with longer term measures that can improve safety in all commercial aircraft."

The FAA then announced the formation of a team of independent experts who, along with senior FAA officials, will study the information garnered from NTSB research on jet fuel; FAA and NTSB will meet with members of the American Petroleum Institute to discuss conversion from Jet-A to JP-5 with a higher flash point; and FAA has asked the Aviation Rulemaking Advisory Committee to study what level of safety is appropriate for existing airplanes, for new production aircraft, and for new designs.

Just for the support of the NTSB's investigation alone, more than 100 FAA employees have completed over 15,000 work hours. The time spent evaluating findings and reviewing comments and reports is almost uncountable, but rest assured, since that dreaded date is but a few weeks away, that your tax dollars have been put to good use by the FAA in assuring that tragic accidents like TWA Flight 800 can be reduced or even eliminated.

All in all, not bad for the purportedly "do nothing" agency.

'Til next time...

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